

Proceedings of the American Academy of Arts and Sciences.

VOL. 52. No. 10. — MAY, 1917.

CONTRIBUTIONS FROM THE CRYPTOGAMIC LABORATORY
OF HARVARD UNIVERSITY. No. LXXIX.

*NEW LABOULBENIALES, CHIEFLY DIPTEROPHILOUS
AMERICAN SPECIES.*

BY ROLAND THAXTER.

CONTRIBUTIONS FROM THE CRYPTOGAMIC LABORATORY
OF HARVARD UNIVERSITY. No. LXXIX.

NEW LABOULBENIALES, CHIEFLY DIPTEROPHILOUS
AMERICAN SPECIES.

BY ROLAND THAXTER.

Received February 28, 1917.

Presented March 14, 1917.

THE present Contribution deals almost entirely with Laboulbeniales parasitic on flies of various families, although I have thought best to include as an addendum to my recent paper on species of *Rickia* (These Proceedings, 52, 1, 1916), two additional species of this genus which were accidentally omitted from it. With this exception only forms from the Western Hemisphere are here included, numerous others which have been received from Africa and the East Indies being reserved for later publication. A majority of the new forms belong to the genus *Stigmatomyces*, which proves to be large and very difficult. Four or five species of this genus are already known to be parasitic on coleopterous hosts, but of the thirty-five new forms here included, only one is found on beetles, while one other is associated with a host new for this genus, being parasitic on a minute Anthocorid bug. The remaining forms of this, as well as of the other genera here considered, all occur on Diptera.

The hosts from which this material has been obtained were collected partly by myself in the West Indies; while various interesting forms were very kindly collected for me by Mrs. J. B. Rorer, at Bocas del Toro, Panama; by Messrs. Bruce and Allen and by Mr. H. Phillip in the Island of Grenada, B. W. I.; by Mr. Carriker in Venezuela; by Mr. W. H. Mann in Mexico; by the late Professor Kellerman in Guatemala and by Mr. Philip Calvert in Costa Rica. The Jamaican and Arkansan forms were procured through local collectors. I desire also to acknowledge my obligations for host determinations to Mr. E. T. Cresson Jr., and to Professor A. L. Melander to whom I am further indebted for the very peculiar *Stigmatomyces Clinocerae*.

INDEX OF SPECIES AND GENERA.

	PAGE.		PAGE.
Ceraiomycetes	718, 719, 721	crassicolis	661
ceratomyces	707	curvirostris	671, 670, 677
Corethromyces	701, 706	Discocerinae	687, 686, 690
Dimeromyces	654	Drapetis	657, 660
Distichomyces	653	dubius	690
Dioicomyces	654	Elachipterae	697
Ilytheomyces	705	Ensinae	665, 667
anomalus	716, 706	gracilis	690, 691
calycinus	714, 712	Grenadinus	662
elegans	707, 706	humilis	678, 680, 693
lingulatus	712, 714	Ilytheae	683
major	713	indentatus	678, 664
manubriolatus	708, 711, 716	inflatus	664
minisculus	711	Italicus	655
obtusus	715	Jamaicensis	676, 670
Panamensis	710	Lasiochili	703, 656
Laboulbenia	717	Leucophengae	699
angulifera	720	Limnophorae	656, 657, 667, 668
crispata	719	Linosinae	660, 663
muscaria	718	lingulatus	693, 695
Sapromyzae	717, 719	longicollis	660
Spiralis	721	micrandrus	681, 683
Laboulbeniella	718-720	Notiphilae	669, 700
Nycteromyces	653	Nycteribiidarum	702, 669
Streblidinus	654	Ochtherae	691
Rhizomyces	706	Ochtheroideae	679, 678, 693
Rickia	651	Papuanus	655, 662
Berlesiana	653	Parydrae	696
flagellifera	652	Paralimnae	674, 672, 673
pinnata	652	pauperculus	688
Stigmatomyces	655	pentandrus	663
Aciurae	668, 667, 669	pinguis	694
ambiguus	689	protrudens	695, 694
Anoplischii	655, 656	Psilopae	682
Atissae	681	purpureus	698
australis	655	rostratus	672
brevicollis	677, 680, 693	rugosus	681
borealis	692, 680	Sarcophagae	657
caribbeus	688, 686	Scaptomyzae	656, 665
Chilensis	685	Sigaloessae	698
Clinocerae	659	Stilici	655
Coccinelloides	704	Streblae	700
compressus	680	verruculosus	667, 657
constrictus	656, 664, 669, 689, 697	virescens	654, 704, 705

INDEX OF HOSTS.

COLEOPTERA	HEMIPTERA
Coccinellidae	Anthocoridae
Elateridae	Lasiochilus pallidus
Leptaulax dentatus	

	PAGE.		PAGE.
DIPTERA		Ochthera sp.	690, 691
Aciura	669	“ exsculpta	690
Anatrachus erinaceus	698	“ mantis	690
Anthomyidae	657	Ochtheroidea sp.	680, 690
Atissa	681, 682	“ glaphropus	681
Borboridae	660, 664	Onesia	657
Clinocera binotata	659	Oscinidae	697
Discocerina	686, 687, 688	Oscinis sp.	698
Drapetis	658	Paralimna ciliata	670, 672, 675, 676
Drosophilidae	698	“ decipiens	670, 673, 675
Elachiptera	697	Parydra sp.	672
Empididae	657	“ humilis	694
Ensina	666, 667, 669	“ imitans	692
Ephydriidae	669	“ pinguis	695, 696
Hippelates	698, 720, 721	“ quadrituberculata	697
Ilythea sp.	683, 684, 706, 708, 709, 701-716	Psilopa	677, 679, 681, 682, 690
“ spilota	685	Sapromyza sp.	665, 718
Leucomelina	657	“ muscaria	719
Leucophenga	700	“ triseriata	718
Limnophora	657	Sapromyzidae	664
Limosina sp.	660, 662	Sarcophagidae	657
“ ferruginea	663	Sigaloessa	699
Lucila dux	657	Siphonella	698
Muscidae	657	Strebla vespertilionis	655, 701
Notiphila	670	Streblidae	700
Nycteribiidae	702	Trypetidae	655

***Rickia flagellifera* nov. sp.**

Hyaline. Body of the receptacle subtriangular, short and stout, triseriate; the basal cell longer than broad, its pointed distal end somewhat intruded between the subequal basal cells of the anterior and posterior series: the anterior series consisting of four successively larger cells, all but the basal one cutting off an appendiculate cell distally and externally, the uppermost in oblique contact with the base of the perithecium: the middle series consisting of four or five successively smaller flattened cells, and extending from the basal cells of the marginal series above the base of the perithecium, to the inner margin of which its two or three upper cells are united: posterior series consisting of five superposed cells, the third and fourth each cutting off two appendiculate cells, the others one; the four lower subequal, the uppermost small, displaced somewhat toward the perithecium, and forming the base of an elongate, slender, flagellate continuation of the posterior series, which consists of a single row of superposed elongate cells, some of them cutting off small appendiculate cells distally; the series ending in the primary appendage and its two basal cells. Perithecium relatively rather large and stout, about three quarters free, slightly bent away from the flagellum, the tip hardly distinguished; the apex broad and truncate, or broadly rounded. Spores about $20 \times 2 \mu$. Perithecium $30-36 \times 12-14 \mu$. Receptacle to base of flagellum $35-55 \times 18-20 \mu$. Total length to tip of perithecium $55-80 \mu$. Longest flagellum $225 \times 5 \mu$.

On *Leptaulex dentatus* F. No. 2393, Mindanao, Philippines.

A species quite unlike any other known form, and easily distinguished from other flagellate types by its triseriate receptacle.

***Rickia pinnata* nov. sp.**

Receptacle becoming somewhat broader distally, its outline more or less even; normally simple; or sometimes producing adventitious axes, usually when injured; the primary axis triseriate above the stout distally rounded basal cell, the secondary axes biserial: hyaline, except that the median series is tinged with brown at the base. The cells of the anterior and posterior series similar, very numerous, mostly somewhat longer than broad: the posterior series extending to the perithecium, with the base of which it is in oblique contact; three or four of

its distal cells, and sometimes a few near its base, cutting off distally and externally, without definite sequence single small cells which bear antheridia the antheridial cells of which become eventually free, or normal appendages: the median series present only in the primary axis and consisting of smaller more flattened cells, beginning above the lowest pair of the marginal series, and extending to the tip of the perithecium, with the curved inner margin of which a series of about ten of its distal cells is united; these cells, except the lowest which are rounded, are broader than long, the uppermost externally free, triangular, its pointed end reaching almost to the apex of the perithecium: the posterior series similar to the anterior, three or four of its lower cells cutting off appendiculate cells distally and externally, but without order; the series otherwise without appendages and extending to the penultimate cell of the middle series to which its terminal, triangular, distally pointed cell is united. Appendages of the usual type, evanescent, the primary appendage apparently lateral near the base, and hardly distinguished. Perithecia rich contrasting brown, the outer margin free, nearly straight, or slightly concave; the inner strongly convex; the broad short tip hardly distinguished, slightly bent outward, the apex truncate or flat-papillate, hyaline-edged. Spores $45 \times 5 \mu$. Perithecia $65-75 \times 23-27 \mu$. Total length to tip of perithecium, longer individuals, 500μ , by 20μ near base and 28μ distally.

On *Leptaularax dentatus* F. No. 2393, Mindanao, Philippines.

A peculiar and very distinct species most nearly resembling *R. Berlesiana*; its most striking peculiarity being the remarkable curved, crest-like or fin-like marginal series of cells which are united to the strongly curved posterior margin of the perithecium, this series being double if the perithecium terminates a primary axis, or single if the latter is secondary; the individual cells in the latter case being several times broader than long. Although the general structure is normal and typical, the antheridial cells appear to become separated as in the type formerly distinguished as *Distichomyces*.

Nycteromyces nov. gen.

Male Individual consisting of a single series of superposed cells; a foot and well developed basal cell; an indeterminate number of small cells bearing compound antheridia, and two terminal, superposed, sterile cells, the upper peculiarly modified.

Female Individual consisting of a well developed basal cell, a small subbasal cell which bears a sterile appendage consisting of a stalk-cell and peculiarly modified terminal cell. The stalk-cells and basal cells of the perithecium not distinguishable at maturity, all partly surrounding the lower ascigerous region. Spores hyalodidymous, ascogenic cell single in the type.

In this very distinct type the stalk- and basal cells of the perithecium are apparently combined to form the wall of the lower portion of the ascigerous cavity, so that what appears to be its main body comprises these cells, as well as the usual four tiers of wall-cells: but since the types are all very young or fully matured, it has not been possible to determine how closely the cell-structure of this region corresponds to that which I have described in detail in connection with the genus *Laboulbenia*. The condition described is approached in *Stigmatomyces virescens*, among hermaphrodite forms, and is very similar to that which occurs in species of *Dimeromyces*, in which the cell-boundaries are quite obliterated at maturity. The peculiar sterile appendage-cell, which occurs in both sexes, recalls the somewhat similar sterile appendage in the female of species of *Dioicomyces*. The genus, however, is evidently most nearly allied to *Dimeromyces*.

• **Nycteromyces Streblidinus** nov. sp.

Male Individual. Basal cell hyaline, long and slender, tapering continuously to the base, where it is slightly enlarged in relation to the small irregularly formed blackened foot, extending as a pointed prolongation slightly beyond the latter. The two to five small short hyaline cells superposed above it, bearing single antheridia in a unilateral series, their venters in close contact, their short broad truncate-conical necks free, diverging upward; the antheridial cells about six in number: the subterminal sterile cell flattened, smoky or dull purplish brown, the terminal one bullet-shaped, or tending to subconical, similarly colored, deeper at the septum, distally apiculate. Total length 86–110 μ . Basal cell 40–52 \times 10 μ . Antheridia 18 \times 12 μ . Terminal cell 18 \times 10–14 μ , the subterminal 4 \times 15 μ broad.

Female Individual. Basal cell hyaline, long and comparatively slender, broader distally, its lower three fourths nearly uniform in width to the small irregular black foot, where it is slightly enlarged and extends into a brownish tooth-like prolongation resting on the host beside the latter. Subbasal cell very slightly longer than broad,

pushed to one side by the base of the perithecial stalk, which occupies more than half the distal surface of the basal cell. Stalk-cell of the appendage smoky or purplish brown, much flattened, horizontal, separated by a thick more deeply colored septum from the concolorous, nearly symmetrical, bullet-shaped, abruptly apiculate sterile appendage-cell, which is similar to that of the male. Stalk- and basal cells of the perithecium not distinguishable as separate cells, the position of the latter indicated by one outer and two inner flattish elevations which lie some distance above the ascigerous cell; the bases of the lower (venter) wall-cells indicated by somewhat more distinct rounded elevations; similar, somewhat less prominent protuberances distinguishing the regions of the neck and tip; the region of the venter broad, of uniform width or slightly inflated, the region below it to the base of the stalk, which includes about half the total length, tapering nearly to its insertion, the neck-region slightly tapering, the tip narrower, clearly distinguished, hardly tapering, bent slightly inward; the apex well defined, slightly shorter than the tip, somewhat asymmetrical, the base slightly and abruptly spreading, as are the lips also, so that the margins are slightly concave, the two inner lips forming rather prominent blunt tooth like projections, the outer shorter and flattened; the whole perithecium, from the insertion of its stalk upward, clavate-fusiform, elongate, the ascigerous and sporigerous regions tinged with dull purplish brown. Spores $42-45 \times 4 \mu$. Perithecia, including stalk $210-280 \times 36-45 \mu$, apex and tip $35-40 \mu$. Basal cell $70-90 \times 21 \mu$; the subbasal $10 \times 18 \mu$. Stalk-cell of the appendage $4 \times 16 \mu$ broad; the appendage-cell $18 \times 14 \mu$. Total length to tip of perithecium $290-360 \mu$.

On the superior abdomen and legs of *Strebla respertilionis* Fabr. No. 2073a, M. C. Z., taken on bats in Venezuela (Carriker).

STIGMATOMYCES.

With the exception of the three species, *S. Anoplischii*, *S. australis* and *S. Stilici*, no further additions appear to have been made to this genus since the publication of my second Monograph. The form described as *S. Italicus* by Spegazzini in his second contribution on Italian Laboulbeniales (Ann. d. Mus. Nac. d. Hist. Nat. d. Buenos Aires, 27, 71, Fig. 37) I am quite unable to distinguish from *S. Papua-nus*, with which he compares it, a widely distributed and variable species.

As material has accumulated the difficulties of the genus have become increasingly apparent, and the variability of many forms is such that anyone who did not have access to large series of specimens would undoubtedly have little hesitation in separating specifically many more forms than are recognized in the present treatment. The variability of many forms is remarkable and confusing. The difficulty is further increased by the fact that some of the species are not only widely distributed, but inhabit varied hosts which do not always belong to the same genus or even family, and it is thus quite unsafe to describe isolated forms without a considerable knowledge of the genus and its variations. *S. constrictus*, for example, is a case in point, being widely distributed and very variable; and, although it is found only on genera of Oscinidae, inhabits very diverse forms in this family. *S. Scaptomyzae* and *S. Limnophorae* are also examples of widely distributed and very variable types inhabiting diverse hosts, in different families.

The character of the appendage is evidently the most reliable means of distinguishing species, but even this may vary in some instances, so that the number and arrangement of the antheridia and androphorous cells is not always a safe guide.

In preparing the following descriptions I have found it desirable to distinguish the four regions of the perithecium, which correspond to the four successive tiers of wall-cells, as venter, neck, tip and apex, these being more or less clearly differentiated in a majority of species by differences in diameter, the presence of subtending elevations or depressions, superficial granulation, verrucosity and the like. The cells immediately below the perithecium are similar to those the arrangement and nomenclature of which in *Laboulbenia* were given in my first Monograph: consisting of three 'basal' cells, immediately below the ascigerous cavity or partly surrounding it; an external cell, the secondary stalk-cell; and the primary stalk-cell, corresponding to cell VI in *Laboulbenia*. The term receptacle is restricted to the basal and subbasal cell, and the stalk-cell of the appendage is that which lies immediately below the insertion of the appendage and is variously related to the cells about it.

It may here be mentioned that *S. Anoplischii*, originally described from Argentina, has again been obtained from Trinidad, B. W. I., and from Mexico, on genera of Elateridae, and that a peculiar form, *S. Lasiochili*, the first in the genus which has been recorded on a hemipterous host, is included in the following enumeration.

On Sarcophagidae, Muscidae and Anthomyidae.

STIGMATOMYCES LIMNOPHORAE Thaxter.

Syn. *St. Sarcophagae* Thaxter.

A very large series of this form has been obtained on a variety of hosts, and from widely separated regions, and shows clearly that the two species above indicated cannot be distinguished specifically. The type of *S. Limnophorae* from California owes its apparent differences to the fact that none of the individuals are fully matured, while a majority are quite immature. Older individuals of this species often attain a length of 700 μ , although on certain hosts they may be constantly smaller, even when fully developed. The twist of the wall-cells is usually hardly distinguishable as a slight obliquity in the venter; while those of the neck may make a complete turn from base to apex, the neck showing corresponding ridges in some cases, and occasionally becoming rough-granular. The number of cells and antheridia in the appendage varies somewhat, and the latter are often more or less remote, owing to its considerable elongation; but the type is a clearly defined one, which is found among other species only in *S. verruculosus*. The form of the venter of the perithecium also varies from that given in my figures, in that the outline of its upper half is often characteristically and symmetrically concave on either side. This is especially true of individuals which occur on species of *Leucomelina*, in which, also, the perithecium as a whole may be somewhat sigmoid.

Additional material has been examined as follows. On *Lucilia dux*, No. 1763, Philippine Is., (Banks), and on what appears to be the same host from Sumatra (Jacobson). On species of *Leucomelina*, Nos. 1734 and 1743, Mandeville, and No. 1860, Balaclava, Jamaica, W. I. On *Limnophora* sp., No. 1644, Los Amates, Guatemala (Kellerman). On *Onesia* sp., Orizaba, Mexico (Mann). On undetermined genera of *Anthomyidae*: No. 2811, St. George, Grenada, W. I.; No. 1881, Troy, Jamaica, W. I.; No. 1817, Fayetteville, Arkansas; Nos. 2639, 2640, and 2646, Kamerun, West Africa.

On Empididae.

Stigmatomyces Drapetis nov. sp.

Rather pale, becoming more or less suffused with dirty yellowish brown, straight or somewhat curved. Basal cell of the receptacle not

differing greatly from the subbasal in length, sometimes considerably longer, tapering continuously to its narrow base and pointed foot, becoming somewhat suffused with the walls greatly thickened by secondary layers, so that the lumen of the lower half may be nearly obliterated; distally slightly rounded or inflated, usually slightly or distinctly broader than the often hyaline subbasal cell, which is narrower below, the margins straight or slightly concave. Stalk-cell of the appendage more deeply suffused, relatively short, the upper half broad, its outer wall greatly thickened, the distal margin broad and rounded and half or more free outside the very narrow insertion of the usually deciduous appendage. Appendage curved, broad in the middle and tapering to its base and apex; the axis consisting of three cells; the antheridia eight in number, sometimes less, turned sidewise or outward; with rather stout, prominent, slightly curved necks; the basal cell short, broad and pointed above, tapering to its narrow hyaline base which is separated from the very narrow insertion by a slight constriction; the three antheridia associated with it superposed and borne on a distinct small androphorous cell, which is separated from it externally; the subbasal cell bearing two antheridia which diverge more or less right and left; while the third bears one, followed by one or by two, superposed and terminal. Stalk-cell and secondary stalk-cell of the perithecium overlapping laterally, more or less similar, or the former larger; the basal cells similar, the external margins slightly convex and more or less conspicuously thickened; all the cells of this region suffused, and concolorous with the stalk-cell of the appendage and the venter of the perithecium; which is relatively rather short and stout, usually slightly shorter or hardly longer than the distal portion from which it is abruptly distinguished by well marked distal prominences corresponding to the terminations of its wall-cells; the neck paler, its margins straight or slightly concave, its base and apex abruptly spreading; distinguished from the stout, slightly tapering tip and apex by an abrupt and conspicuous inflation; the apex shorter than the tip, its blunt, often asymmetrically rounded termination at length subtended by a minute papilla on either side. Spores $38-40 \times 3.5 \mu$. Perithecia $120-150 \mu$, the venter $50-60 \times 35-50 \mu$. Appendage $50-70 \times 20 \mu$. Receptacle $70-90 \times 17-20 \mu$. Total length $280-200 \mu$ or less.

On species of *Drapetis*, Nos. 1707 and 1724, Mandeville, No. 1928, Battersea and No. 1870, Balaclava, Jamaica, W. I.; No. 2521, Bocas del Toro, Panama (Rorer). Also from Sangre Grande, Trinidad, B. W. I.

This species is especially well distinguished by its deciduous antheri-

dium which seldom persists in older individuals, breaking readily from its very narrow insertion, even in less fully matured specimens. It is of a type quite unlike that of *S. Clinocerae*, which is the only other species as yet observed on flies of this family.

Stigmatomyces Clinocerae nov. sp.

Perithecium with its three basal cells and the basal cell of the appendage suffused with amber-brown; the neck-portion paler, the remaining cells hyaline or nearly so. Receptacle relatively slender, of nearly uniform diameter, or somewhat tapering, the basal cell as long as the subbasal, or not more than half as long. Stalk-cell of the appendage hardly broader distally, about twice as long as broad, its base oblique, occupying somewhat less than half the distal end of the subbasal cell; its distal end but slightly broader than the insertion. Appendage straight, or slightly curved inward; consisting of as many as eighteen cells, more often of about fourteen, obliquely superposed, nearly equal in size, broader than long, externally strongly convex, and thus separated by prominent indentations; the basal cell slightly larger and deeply suffused, the rest hyaline, each bearing a single antheridium; the antheridia obliquely superposed in a single series, usually turned inward, the necks appressed, the venters about as large as the cells which bear them; the series terminated by a single antheridium, often abortive. Stalk-cell of the perithecium vertically elongated, parallel to the stalk-cell of the appendage and similar, though somewhat broader; the cells above it somewhat smaller, subequal; the secondary stalk-cell very obliquely separated from the primary stalk-cell, tapering downward to a pointed base which ends slightly below the middle of the latter. Venter of the perithecium much broader than the basal cell region, symmetrically and considerably inflated below, tapering considerably distally to the hardly distinguished neck; which is slightly shorter than the venter, slightly curved and tapering; the tip and apex not distinguished, slightly geniculate, relatively long, tapering to a blunt hyaline unmodified termination. Spores $18 \times 2.8 \mu$. Perithecia $140-170 \times 30-36 \mu$. Appendage, longest $74 \times 8-10 \mu$. Receptacle $60-88 \times 14-18 \mu$. Total length to tip of perithecium 260μ , the longest 300μ .

On the inferior abdomen of *Clinocera binotata* Loew. No. 2503, Tecoma, Washington.

This very distinct species, which was obtained from a host very

kindly communicated to me by Professor Melander, is most nearly allied to the species which occur on flies of the genus *Limosina*, its indeterminate appendage corresponding closely to that of *S. Limosinae*, and similarly developed through the activity of a terminal cell, which separates successive basal segments to form the axis. Its type is quite unlike that of *S. Drapetis*, the only other form which has thus far been observed on Empididae.

On Borboridae.

***Stigmatomyces longicollis* nov. sp.**

Nearly hyaline, the venter and its basal cells, together with the basal cell of the appendage, only, suffused with pale yellowish brown. Basal cell of the short receptacle slightly longer than the subbasal, which is hardly longer than broad. Stalk-cell of the appendage somewhat prominently rounded outward below the broad insertion of the appendage. Appendage consisting of not more than eighteen or nineteen very obliquely superposed cells, long and slender, tapering; the basal cell flat and disc-shaped, the distal septum hardly oblique, narrower than the subbasal; which projects beyond it and, like those above, is flattened-elliptical in outline, with strongly convex outer margin; the lower cells bearing two, the upper single antheridia on their inner sides; the long necks appressed, the uppermost more or less abortive. Stalk-cell of the perithecium, in size and shape, not unlike that of the appendage inverted, and lying beside it; the secondary stalk-cell somewhat smaller and shorter, its inner margin in oblique contact with it; the basal cells more or less similar and uniform, the region usually very slightly broader than the base of the venter: the venter slightly and symmetrically inflated, passing without differentiation to the broad base of the neck, which is enormously elongated, relatively slender and of nearly uniform diameter above its base: the tip distinguished by a slight but distinct depression of the outline on either side; the very short apex narrowing to a small, blunt, symmetrical or slightly oblique, obscurely papillate extremity. Spores $18-20 \times 2.5 \mu$. Perithecia $245-450 \mu$; the venter $56 \times 36-35 \times 26-30 \mu$; the neck $190-380 \times 14 \mu$; the tip and apex 22μ . Appendage $90-120 \mu$. Réceptacle $40-45 \times 18-20 \mu$. Total length to tip of perithecium $300-525 \mu$.

On the posterior legs and abdomen of species of *Limosina*. No.

1864, a (Type), b and c, Balaclava; No. 2049, Clarkstown, Jamaica, W. I.

This species is very closely allied to *S. crassicollis*, with which it agrees in general structure. It differs in its more slender habit, very elongate slender appendage, which is composed of twice as many cells, and in its enormously elongated slender neck and relatively smaller venter. About a dozen examples have been examined from five individual hosts.

***Stigmatomyces crassicollis* nov. sp.**

Pale yellowish or nearly hyaline, the venter, basal cell region and the base of the appendage more or less suffused with yellow brown. Receptacle tapering to a pointed base, usually straight, or very slightly curved, usually very short; the cells subequal, separated by a slightly oblique septum and forming, with the stalk-cells of the perithecium and that of the appendage, a compact triangular cell-group with even outline; rarely somewhat more slender and irregular. Stalk-cell of the appendage but slightly broader distally, its whole upper surface occupied by the very broad insertion of the flat, colored basal cell, the narrower outer end of which protrudes externally. Appendage curved toward the venter; the axis consisting of not more than nine or ten cells, the lower producing two, the upper single antheridia directed inward, those above the basal cell flattened elliptical, obliquely superposed, externally separated by well defined indentations. Stalk-cell of the perithecium about as long and large as that of the appendage, not reaching quite as high as the smaller secondary stalk-cell which overlaps externally its upper four fifths, and is similar in general to the basal cells above it. Perithecium usually straight, or the distal portion slightly curved; the venter sometimes very slightly narrower and indented above the basal cell region, giving it a slight cup and ball effect; short, stout, symmetrical, broadly ovoid, or sometimes almost spherical; its outline evenly continuous with that of the spreading base of the very stout and elongate neck, which tapers very slightly distally: the tip and apex very short, but slightly distinguished by its more rapid tapering; the apex nearly symmetrical bearing four similar minute papillae. Spores $20-22 \times 2 \mu$. Perithecia $140-325 \mu$ longest; the venter $35-60 \times 38-64 \mu$; the neck 350μ and less \times about 25μ toward base; the tip and apex 18μ . Appendage $35-70 \mu$. Receptacle $50-70 \times 22-35 \mu$. Total length to tip of perithecium, small 200μ , largest 430μ , average 275μ .

On the abdomen and legs of species of *Limosina*. No. 1863 (Type), and 1865, Balaclava; No. 1747, Mandeville, Jamaica, W. I.

This species is most nearly related to *S. Papuanus* which occurs on similar hosts in the Western Hemisphere, and is distinguished from it by the different relations of its perithecial stalk- and basal cell, and by its symmetrical papillate apex which is never modified by the presence of the terminal prolongation so characteristic of the papuan form. Abundant material has been examined, the individuals varying for the most part only in size, although those numbered 1865 are somewhat more slender in habit, with less compact receptacles.

***Stigmatomyces Grenadinus* nov. sp.**

Rather slender and irregularly formed; basal region of the appendage and perithecium, as well as the venter, becoming tinged with pale brownish yellow. Receptacle hyaline, of nearly uniform diameter, with somewhat uneven outline; the basal cell shorter, and distally slightly broader, than the subbasal, which is symmetrically distinguished from the parts above by a slight indentation. Stalk-cell of the appendage stout, slightly longer than broad, not overlapping the subbasal cell; its outer margin convex, more strongly so distally where it bulges somewhat below the rather broad insertion. Appendage relatively small, hyaline except the faintly suffused basal cell; its axis consisting of not more than three or four successively smaller cells; the basal slightly broader than long, and faintly suffused; the second and third slightly oblique, longer than broad, their thick outer walls strongly and asymmetrically convex; the two lower cells bearing each two antheridia lying side by side, one much higher than the other: the third cell bearing a single antheridium which subtends one or sometimes two superposed terminal ones, both or all of these latter often abnormally developed: the antheridia rather large, almost wholly free, directed obliquely sidewise. Stalk-cell and secondary stalk-cell of the perithecium similar in size, irregularly four-sided, slightly longer than broad, the latter extending to the subbasal cell and similar to the basal cell above it, the outer margins of both individually rather strongly and evenly convex. Venter of the perithecium subpiriform, its base distinguished externally by a slight indentation, evenly inflated below, tapering somewhat distally where it is continuous with the slightly spreading base of the hardly differentiated neck: neck relatively stout, nearly uniform above its base, slightly

longer than the venter, straight or slightly curved, its distal end slightly broader; the tip stout, but somewhat narrower, often slightly geniculate; the apex not distinguished, its termination broad and bluntly rounded, with slightly irregular outline. Spores $18 \times 3 \mu$. Perithecia $85-100 \mu$; the venter $35-38 \times 24-28 \mu$; the neck $35-38 \times 11 \mu$; the tip 18μ . Appendage about 35μ . Receptacle $50-70 \times 14 \mu$. Total length to tip of perithecium $150-185 \mu$.

On legs of *Limosina ferruginca* St., No. 2528, Grand Etang, Grenada, B. W. I.

This species was found in abundance on hosts flying over dung on the Grand Etang road. Although nondescript in appearance, it is of interest for the reason that it belongs to a type transitional between that of the more ordinary forms, and that of the group represented by *S. Limosinae* and its allies, to which it is very evidently nearly related.

***Stigmatomyces pentandrus* nov. sp.**

Receptacle relatively long and stout, subhyaline, of nearly uniform diameter throughout, slightly broader in the region of the horizontal septum; the walls unusually thick, the basal cell usually shorter than the subbasal. Stalk-cell of the appendage somewhat obliquely inserted on the protruding outer angle of the subbasal cell, rather deeply suffused with amber-brown, concolorous with the venter of the perithecium, narrow, its outer margin strongly concave, slightly prominent and rounded below the insertion of the short, straight, slightly tapering appendage. Appendage consisting of two cells, the basal hardly longer than broad and bearing two antheridia; while the subbasal bears but one, and is succeeded by two superposed antheridia, the terminal one erect and bearing a stout spine. Stalk-cell of the perithecium somewhat larger than the cells above it, and less deeply colored than the flattened basal cells; the whole region, including the stalk-cell of the appendage, relatively short, abruptly narrower than the distal end of the receptacle, and forming a slight constriction, thence expanding almost symmetrically upward to the venter of the perithecium; which is relatively very short and broad, symmetrically inflated; its surface, as well as that of the neck and at maturity even the tip, indistinctly and evenly granular; distally narrower and at once abruptly broader at its junction with the broadly, but not abruptly, spreading base of the neck; which is distinctly longer, stout, slightly paler, its distal half of uniform diameter, but abruptly

broadier below its junction with the tip, which is thus clearly distinguished by rounded elevations on either side; the tip paler, but becoming slightly granular at full maturity, abruptly and considerably narrower, short, stout, its margins more or less distinctly convex: the apex much shorter, abruptly narrower, hyaline, the lips nearly equal, rather prominent, the outer slightly longer. Spores $36 \times 4 \mu$. Perithecia 124μ ; venter $42-51 \times 42-44 \mu$; neck $50-54 \mu$; tip and apex $22-25 \mu$. Appendage $34 \times 10 \mu$. Receptacle $110-170 \times 22 \mu$. Total length to tip of perithecium $245-315 \mu$.

At the base of the posterior legs of an undetermined fly belonging to the Borboridae. No. 2037, Near Cartago, Costa Rica (Calvert).

This species recalls *S. indentatus* in the form and position of the stalk-cell of its appendage, while the latter is unlike that of most species known to me; the third cell being completely transformed to an antheridium. It is difficult to determine in the three specimens examined whether the basal cell of the appendage always bears two antheridia, owing to the position of the individuals. The form of the perithecium, although the venter is relatively shorter, recalls that of *S. constrictus*. I am greatly indebted to Mr. Calvert for communicating the specimen on which this species occurred.

On Sapromyzidae.

***Stigmatomyces inflatus* nov. sp.**

Form rather long and slender. Basal cell of the receptacle tapering to the pointed base, the upper half hyaline, the lower tinged with brownish yellow and more or less distinctly banded transversely; subbasal cell usually somewhat more than twice as long, hyaline, becoming but slightly broader distally. Stalk-cell of the appendage rather long and narrow, extending to the subbasal cell, but rarely overlapping it slightly, distally hardly prominent: appendage consisting of four superposed cells; the basal thick-walled, nearly twice as long as broad, persistent, amber-brown, concolorous with the venter of the perithecium; the subbasal occupying the whole width of the appendage, slightly tinged, its lateral walls persistent, bearing distally and externally two superposed antheridia; the rest of the appendage hyaline, thin-walled, and soon shriveled; the third and fourth cells bearing each two superposed antheridia which occupy the whole outer margin; the series ending in two obliquely superposed

antheridia; the series of antheridial necks hardly diverging from one another. Stalk-cell of the perithecium relatively large and long, its outer half free, the pointed base of the secondary stalk-cell extending down beside its outer upper half, irregularly triangular, and much smaller; of the three basal cells, the inner extends lower than the others beside the distal end of the secondary, to the upper margin of the primary stalk-cell. Venter of the perithecium more deeply suffused, nearly symmetrical, its outline abruptly convex above the relatively narrow base, then somewhat concave, then abruptly convex and broader; so that the distal half, or less, appears to be rather abruptly inflated; the terminations of the wall-cells swollen, and separated by depressions; the neck abruptly distinguished, long, its base slightly broader and spreading, otherwise of about the same diameter throughout, or slightly broader distally; the tip slightly bent, distinguished by an abrupt depression and elevation of its outline, not quite symmetrical on either side; the apex much shorter, not distinguished, ending bluntly with minute hardly distinguishable papillate elevations about the pore. Spores about $18 \times 3.5 \mu$. Perithecia; stalk and basal cell region $54-62 \times 18-23 \mu$; venter $55-65 \times 38-45 \mu$; neck $90-100 \times 15 \mu$; tip and apex $26-30 \times 15 \mu$. Appendage $55-62 \mu$. Receptacle $100-120 \times 18 \mu$. Total length to tip of perithecium $310-390 \mu$.

On the superior surface of the abdomen of *Sapromyza* sp. Nos. 2495 and 2494, Orizaba, Mexico (Mann).

This species is perhaps more nearly allied to *S. Scaptomyzae* but is clearly distinguished by its inflated venter and other details of structure.

On Trypetidae.

Stigmatomyces Ensinae nov. sp.

Nearly hyaline to the basal cells of the perithecium, the rest dull reddish amber-brown. Basal cell usually curved, tapering below, often somewhat inflated distally, and becoming narrower below the base of the subbasal cell; which is distinctly and usually very abruptly broader, stout, seldom more than twice as long as the basal cell, often inflated in the mid-region, and slightly contracted above and especially below. Stalk-cell of the appendage long and narrow, its attenuated base reaching to the subbasal cell, its distal end hardly broader than the basal cell of the appendage, from which it is separated by a slight

abrupt constriction. Appendage consisting of four cells; the basal hardly broader distally, where it is separated by an almost horizontal septum from the subbasal cell, without antheridia; subbasal cell somewhat smaller than the cell above, both bearing distally and externally two antheridia which diverge irregularly laterally; the fourth cell bearing one antheridium which is followed by two others, superposed, bent inward, and terminating the appendage; the antheridia stout, rounded, closely appressed, so that the outline of the appendage is more or less even, without distinctly projecting necks, the spinous process from the terminal antheridium apparently not persistent; the antheridia and all the cells of the appendage persistent and rather thick-walled. Stalk-cell of the perithecium very large, somewhat broader than the subbasal cell, more than twice as long as the secondary stalk-cell; which is subtriangular in outline, and obliquely separated from it distally and externally; the basal cells triangular in outline, but slightly smaller than the secondary stalk-cell: venter nearly symmetrically long-elliptical, or narrower distally; the wall-cells becoming twisted in a spiral of two strong curves which may make somewhat more than half a turn, the edges forming broad wing-like elevations from base to apex; the somewhat spreading base of the neck clearly, but not abruptly distinguished; the neck distinctly shorter than the venter, its diameter nearly uniform above the base; the tip subtended by a slight and abrupt constriction, abruptly inflated, short, subsymmetrical; the apex of about the same length, truncate conical, or distally very slightly oblique when viewed sidewise; the lip-cells paired, two lower and two higher, but hardly projecting, the lips not at all distinguished or prominent. Spores $27 \times 3.6 \mu$. Perithecia; stalk-cell $35-60 \times 25-30 \mu$, the stalk-cell and basal cell region about $60-70 \times 35 \mu$: venter $75-100 \times 50-55 \mu$; neck $45-60 \times 18-20 \mu$; tip $15 \times 18-20 \mu$; apex $14-16 \mu$. Appendage $50-55 \times 12.5 \mu$; its basal cell $12-14 \times 7.5 \mu$; its stalk-cell $35-76 \times 7.5 \mu$. Receptacle $80-150 \times 20 \mu$. Total length to tip of perithecium $300-400 \mu$.

On various parts of *Ensina* spp. Mandeville, Jamaica, Nos. 1711, 1712.

This form, although it has been examined in considerable numbers, appears to be subject to the attack of a species of *Cladosporium* which destroys it. It is well distinguished by its peculiar appendage, the spiral, winged wall-cells of its venter, the large perithecial stalk-cell, the usually abruptly broader base of the subbasal cell of the receptacle, and the long and very narrow stalk-cell of the appendage.

Stigmatomyces verruculosus nov. sp.

Habit rather long and slender. Receptacle elongate, the basal cell quite hyaline, about four fifths as long as the subbasal, which is more or less evidently suffused with pale brownish yellow; a more or less distinct enlargement in the region of the septum, involving both cells; the receptacle otherwise of nearly uniform diameter, or expanding slightly distally. Stalk-cell of the appendage relatively short and broad, its broad obliquely rounded base in contact with the subbasal cell, more deeply suffused with dull reddish amber-brown, concolorous with the perithecium and its basal and stalk-cells. Appendage slightly divergent and curved outward distally, consisting of three cells, a small fourth cell sometimes distinguished; the basal cell concolorous with the stalk-cell and abruptly narrower, more than twice as long as broad, and bearing distally two antheridia; the second and third cells successively smaller, bearing two and one respectively; the strongly curved termination of the appendage terminated by two, the uppermost often undeveloped. Stalk-cell and secondary stalk-cell of the perithecium of about the same size, broader than long, the basal cells above them somewhat smaller, the outer one and the secondary stalk-cell abruptly convex externally; venter darker, granular-verruculose, rather short and stout, strongly and symmetrically inflated, sometimes but slightly longer than broad; the wall-cells separated by a clean cut shallow groove, forming a little more than one quarter of a turn; neck granular roughened, but not very abruptly distinguished, tapering very slightly or not at all from its slightly spreading base, distally abruptly slightly enlarged below the tip; which is somewhat narrower, short and stout, symmetrical, not distinguished from the still shorter apex, the margins of which curve abruptly and symmetrically to the rather broad, nearly truncate termination; the lips hardly distinguished. Spores about $28 \times 4 \mu$. Perithecia; stalk- and basal cell region about $35 \times 32 \mu$; venter $48-55 \times 40 \mu$; neck $62-75 \times 18 \mu$; the tip and apex $19-21 \times 14 \mu$. Appendage about 60μ , its basal cell $21 \times 7.5 \mu$, its stalk-cell $27 \times 10.5 \mu$. Total length to tip of perithecium $280-312 \mu$.

On the abdomen of *Ensina* sp. Mandeville, Jamaica, Nos. 1711 and 1712. St. George, Grenada, W. I. No. 2061.

This species is most nearly related to *S. Limnophorae*, and is in some respects intermediate between *S. Ensinae* and *S. Aciurae*. It is distinguished from the first mentioned species by its verrucose, not

merely granular venter, relatively shorter, stouter neck, and shorter stouter appendage which is less highly developed, having usually but three cells. The wall-cells of the venter are distinctly spiral in the present species, while those of the neck are straight: but in *S. Limnophorae* the converse is true, the wall-cells of the venter in this species having merely a slight obliquity.

Stigmatomyces Aciuræ nov. sp.

Form elongate, the receptacle hyaline, the rest more or less tinged with dull amber-brown. Basal cell usually bent and broadly rounded at base, stout, hardly tapering; subbasal cell usually abruptly narrower, and separated from the basal by a more or less pronounced enlargement in the region of the septum; usually much elongated and of about the same diameter throughout, sometimes shorter and distally broader. Stalk-cell of the appendage reaching to the subbasal cell, but hardly if at all over-lapping it, relatively short and distally broad, its base blunt; the basal cell of the appendage large, narrow at the base, its margins slightly concave, broader distally, darker, bearing distally on the inner side two antheridia diverging irregularly laterally; the rest of the appendage consisting of two axis-cells, the lower larger, producing two suberect antheridia; the upper smaller producing one antheridium lying beside a single antheridium which terminates the appendage, and is furnished with a large stout spine at the base on its inner or outer side; these four antheridia erect, or but slightly divergent, forming a more or less regular terminal crown; the whole appendage somewhat thick-walled, suffused and permanent, except the necks of the antheridia which soon collapse. Stalk and basal cells of the perithecium relatively small, and forming a compact base, distally concave, the outer basal cell rather abruptly prominent below the narrower base of the venter; which is slightly inflated and nearly symmetrical; the margin subdistally concave below the distinctly prominent terminations of its wall-cells, which have a hardly perceptible twist, and an indistinctly and transversely striate or granular surface: neck abruptly distinguished, stout, longer than the venter, its margins concave, symmetrical, abruptly broader distally; the tip abruptly somewhat narrower, tapering slightly, relatively short; the apex distally oblique, not distinguished, its four cells forming coarse, paired prominences, the anterior higher, which surround the closely united lips; the latter combined to form a projection extending

above the others. Spores $50-55 \times 4.5 \mu$. Perithecium: stalk- and basal cell region $64-70 \times 78 \mu$; neck $55-75 \times 24 \mu$, its distal enlargement $\times 23-28 \mu$; tip and apex 32μ . Appendage $55 \times 18 \mu$ its basal cell $20 \times 12 \mu$ distally; the stalk-cell $35 \times 16 \mu$ distally. Receptacle $150-350 \times 18-27 \mu$. Total length to tip of perithecium $330-550 \mu$.

On the legs and abdomen of *Aciura* sp. No. 1714, and *Ensina* sp., Nos. 1711-12; Mandeville, Jamaica, W. I.

This species varies greatly in length, owing to the variable elongation of its subbasal cell. Its characters are otherwise in general very constant, except that the narrowing of the subbasal cell, and the enlargement of the distal end of the basal, are variable in their degree and abruptness. The species seems more nearly allied to *S. constrictus* in its general characters, although the appearance of its appendage suggests that of the somewhat anomalous *S. Nycteribidarium* owing to the close grouping of the four terminal antheridia and the early disappearance of their necks. Abundant material has been examined.

On Ephydriidae.

Stigmatomyces Notiphilae nov. sp.

Quite hyaline, or nearly so, below the basal cells of the perithecium. Foot minute and abruptly distinguished. Basal cell of the receptacle stout, sometimes but slightly longer than broad; the subbasal cell longer, its width usually two to three times its length; the three cells immediately above vertically elongated and parallel to one another, lying side by side, the group as a whole usually rather abruptly broader than the subbasal cell, and more prominently so on the perithecial side; the posterior of these three cells, which is the stalk-cell of the appendage, is narrower than the others and usually extends slightly higher and lower, often just overlapping the end of the subbasal cell; the middle one (stalk-cell of the perithecium), usually slightly smaller and shorter than the secondary stalk-cell which extends somewhat higher. Stalk-cell of the appendage narrower below its distal margin, often rather abruptly horizontal and twice, or more than twice as broad as the constricted narrow dark insertion of the appendage, which lies close against the base of the inner basal cell of the perithecium. Appendage straight, erect or slightly divergent, four-celled; the basal cell small, faintly colored, narrower below, its distal margin usually

slightly oblique, bearing no antheridia; the subbasal usually five sided, but slightly longer than broad, bearing a single antheridium on the inner side; the third and fourth subtriangular, flattened, the latter often slightly larger, each bearing a single antheridium; the series of three superposed, their curved necks turned toward the perithecium, and terminated by a fourth which is conspicuously spinose on its inner side just below the middle. Inner basal cell of the perithecium more than twice as long as broad, extending somewhat lower than the slightly stouter and shorter outer cells which lie parallel to it, all faintly yellowish: venter of the perithecium more distinctly suffused, of nearly the same diameter throughout, or slightly inflated, about as long as the distal portion; the wall-cell becoming distinguished at maturity by usually inconspicuous ridges, which acquire a spiral twist, making about a quarter turn, and each ending in a slight prominence below the rather abruptly distinguished neck, which tapers slightly: the tip clearly, but not very abruptly distinguished, slightly more than twice as long as broad, distally somewhat inflated, or even geniculate below the short rounded slightly inflated apex; the lip-cells hardly, or but slightly prominent. Spores $36 \times 4.5 \mu$. Perithecia above basal cells, $185-200 \times 30-35 \mu$, maximum $250 \times 40 \mu$: the basal cell region $30-40 \times 26-28 \mu$. Receptacle $70 \times 25 \mu$, maximum $150 \times 28 \mu$. Total length $325-400 \mu$, maximum 410μ : to base of appendage $125-140 \times 38 \mu$; maximum $235 \times 38 \mu$. Appendage $65-75 \times 10 \mu$, maximum 85μ .

On the abdomen and legs of *Notiphila* spp., No. 1859 (Type), Balaclava Jamaica: Nos. 2808-2809, St. George, Grenada, W. I.

A species very clearly distinguished by its peculiar appendage, and the arrangement of its cells above the receptacle. It usually grows in tufts on the legs, but the shorter and more compact form, which is found on the abdomen, has been taken as the typical one. The species varies but slightly, except that individuals growing on the legs may be very much elongated. The four ridges which separate the wall-cells of the venter, are not at first distinguishable, but become more prominent as individuals become fully mature.

Of the forms which are parasitic on species of *Paralimna*, *P. ciliata* and *P. decipiens*, a large series has been examined, and it has proved very difficult satisfactorily to determine their specific limitations. The two forms which I have called *S. Jamaicensis* and *S. curvirostris* seem well defined, owing to the character of the appendage, as well as to their general form. Among the others, however, such numerous variations appear to exist, that I have even hesitated to separate

among them the two most clearly distinguished types. This has been largely owing to the fact that, despite their considerable differences in form and cell relation, the appendage is in general very similar in all; ending in two superposed antheridia, the upper spinose; while of its three axis-cells the basal bears three, the subbasal two and the distal single antheridia, all of which are superposed in a single row with little if any of the usual right and left divergence. The basal cell, moreover, is somewhat colored and persists, keeping its form, while the rest of the appendage is quite hyaline and usually shrivels at an early stage, so that its exact structure is ascertained with difficulty. The form and relative development of the receptacle and perithecium, however, vary greatly; and although there are two well distinguished types, both of which may occur in the same position on the hosts abdomen, those which grow elsewhere often vary so considerably that it is difficult to determine whether they should be regarded as distinct species, and, if not, to which of the two primary species they should be referred, if they are treated as varieties. The following disposition of them must therefore be regarded as tentative.

***Stigmatomyces curvirostris* nov. sp.**

Pale yellowish, the venter of the perithecium becoming tinged with amber-brown, its surface at maturity transversely finely granular-punctate. Basal cell of the receptacle somewhat longer than broad, somewhat narrower below; the subbasal cell of the same width and about twice as long, separated by a horizontal septum, its upper half or two thirds overlapped by the long slender stalk-cell of the appendage; which tapers very slightly to its base, and is rather abruptly and prominently rounded below the basal cell of the appendage, where it is tinged with amber-brown. Appendage consisting of four cells; rather long, slender and distally attenuated; the insertion horizontal and on a level with the distal end of the secondary stalk-cell of the perithecium, the basal cell twice as long as broad, or less, tinged with amber-brown, bearing distally from a very oblique insertion, three superposed antheridia, the upper two of which lie closely against the margin of the subbasal cell; the latter, and also the cell above it, as large or longer than the basal cell, separating two superposed antheridia each; the fourth cell, separating a single antheridium, and surmounted by two superposed antheridia which terminate the appendage. Stalk-cell and secondary stalk-cell of the perithecium of about equal length, the two combined more than twice as long as broad,

separated by a nearly vertical septum, the latter cell somewhat broader distally, and barely separated from the subbasal cell of the receptacle by a narrow external protrusion from the base of the former; the other three basal cells, lying above these two, relatively long, subequal and forming a short stout stalk about as broad as the lower part of the venter, the base of which lies far above the insertion, of the appendage. Perithecium bent outward from the base; its venter seldom broader than the latter, except just above the middle, where it may be rather abruptly swollen at maturity, its distal third or fourth rather abruptly narrower above this swelling; the neck abruptly somewhat narrower, more or less strongly curved outward, rather long and of the same diameter throughout; the tip slightly distinguished and very slightly narrower, hardly tapering; the blunt apex not at all distinguished; the lips broadly rounded and not prominent. Spores about $28 \times 2.5 \mu$. Perithecia above base, $195-225 \times 30 \mu$. Appendage $80-90 \mu$, its stalk-cell $100-118 \times 12 \mu$. Receptacle $58-70 \times 15 \mu$. Length from subbasal cell to base of venter $68-78 \times 22 \mu$. Total length to tip of perithecium $300-390 \times 30-40 \mu$.

Growing at or near the tip of the abdomen of *Paralimna ciliata* Cress. Nos. 1871 (Type), 1733, 2052 from Balaclava, Mandeville and Clarks-town, Jamaica. Nos. 2805, 2810, from St. George, Grenada, W. I. On *Parydra* sp. No. 2042, Clarkstown, Jamaica, W. I.

This species is distinguished from allied forms on similar hosts by its rather slender, four-celled, tapering, persistent appendage, the narrow stalk-cell of which is greatly elongated, and may extend downward almost to the basal cell of the receptacle. The stalk-cell and secondary stalk-cell of the perithecium are also unusually elongated, and lie nearly parallel to one another below the three upper basal cells, which form a short stout perithecial stalk. Like *S. Paralimnae* and other related forms, its appendage is peculiar in that the antheridia, when more than one are produced from a single cell, are more or less exactly superposed, with little if any of the usual right and left divergence. The terminal antheridium appears to lack the persistent spine usually present in its allies.

***Stigmatomyces rostratus* nov. sp.**

Yellowish or more often tinged with brown or olivaceous above the relatively short pale receptacle. Basal cell similar to the subbasal, or usually somewhat longer, narrower below, hardly if at all overlapped

by the stalk-cell of the appendage. The latter relatively short, its base bluntly rounded, its distal end broad, its outer margin slightly concave, distally rather abruptly convex. Region of the insertion rather conspicuously hyaline, nearly horizontal. The appendage consisting of three cells, the basal more deeply suffused, concolorous with the stalk-cell, and almost as long, bearing distally and externally three superposed antheridia; the subbasal cell often as long as the basal, narrow, bearing two superposed antheridia which lie almost wholly above it; the third cell half as long, bearing a single antheridium which is followed by two that are terminal and superposed, the eight superposed in a single row, or but faintly suffused, hyaline, concolorous with the subbasal and third cell. Stalk-cell of the perithecium subtriangular, the distal angle rounded or truncate, hardly longer than it is broad at its base, which occupies the whole distal margin of the subbasal cell of the receptacle; secondary stalk-cell slightly smaller, subtriangular, distally prominent externally, the prominence associated with a peculiar thickening similar to that of the outer basal cell above it, the margin of which is rather abruptly concave; the inner basal cell somewhat narrower, its middle opposite the insertion of the appendage. Venter of the perithecium relatively very long, yellowish, suffused with brown or olivaceous, concolorous with the cells below, but becoming darker; its lower half or more almost symmetrically inflated, tapering gradually to the slightly but abruptly distinguished distal portion of the perithecium, which may equal the venter in length, but is usually somewhat shorter; the whole of nearly the same diameter throughout, except that the tip is very slightly narrower, usually curved outward; the apex not distinguished blunt; the lips coarse and but slightly prominent. Spores about $28 \times 3 \mu$. Perithecia: venter $100-115 \times 35-45 \mu$; neck and tip $90-100 \times 16-18 \mu$. Receptacle $80-95 \times 22-26 \mu$. Appendage $75-85 \mu$, its stalk-cell $35 \times 16 \mu$; its basal cell $28-30 \mu$. Total length to tip of perithecium $330-350 \mu$.

On *Paralimna decipiens* Lw., No. 1915, (Type), Porous, No. 1913, Williamsfield; No. 1741 and 1748, Mandeville; No. 1747; Clarks-town, Jamaica. No. 2529, Grand Etang, Grenada; W. I.: in all cases near the tip of the abdomen.

This species is not subject to any considerable variation except in color, the olivaceous shade being absent in some of the material. On the legs of the same host, however, occurs a shorter and stouter form, which is not unlike the less well developed types of *S. Paralimnae* which occur in a similar position, and I have been unable to

decide whether it should be regarded as a variety of the present species or of the last mentioned form, or whether it should perhaps be regarded as specifically distinct. It occurs rather rarely, and is usually very crowded, but does not seem to vary definitely toward either type.

Stigmatomyces Paralimnae nov. sp.

Form usually subsigmoid, rather short and stout; the perithecium, above its basal cells, comprising two thirds to three fourths of the total length; yellowish, becoming tinged with amber-brown, except at the base, sometimes with an olivaceous tinge. Basal cell of the receptacle short, stout, subtriangular; subbasal cell broader than long, overlapped more or less on its posterior side, sometimes as much as two thirds or more, by the stalk-cell of the appendage; the latter relatively large and prominently convex externally, about twice as long as broad, distally narrow, persistent, slightly colored: the rest of the appendage hyaline, rather broad, soon collapsing; the antheridia obliquely superposed in a single row, the necks with little if any right and left divergence: the basal cell usually producing three antheridia, the subbasal two, the uppermost one; the appendage terminated by two superposed antheridia, and lying flat against the perithecium, or with the antheridia directed outward. Stalk-cell and secondary stalk-cell of the perithecium in oblique contact; the former somewhat larger, its base in contact with the whole or nearly the whole of the upper surface of the subbasal cell; the two combined broader than long, obliquely separated: the three basal cells above but slightly smaller, forming a short, broad insertion, even slightly broader than the base of the venter; the latter granular, when fully mature, and more deeply suffused; about three times as long as broad, its margins becoming slightly convex; the four wall-cells slightly spiral, making less than a half-turn, variably prominent, typically separated by often indistinct furrows, and usually more or less abruptly individually prominent distally, thus accentuating the abrupt transition to the much narrower neck; distal portion of the perithecium very indistinctly, or not at all, distinguished into neck, tip and apex, except that the neck portion is usually nearly hyaline or paler, while the tip and apex are more distinctly suffused; the whole termination usually more or less strongly curved, slightly inflated near the middle, or tapering slightly from near the base; the lip-cells asymmetrically and variably prominent, sometimes conspicuously papillate, or even

vesicular, hyaline, often forming a slightly bent, snout-like termination. Spores $35 \times 4 \mu$. Perithecia, venter $60-75 \times 22-28 \mu$; distal portion $50-58 \times 15 \mu$. Length from foot to base of venter $50-70 \times 22-30 \mu$. Appendage about $40-45 \mu$. Total length to tip of perithecium, $150-175 \mu$.

On the abdomen, legs and base of wing of *Paralimna ciliata* Cress., No. 1811 (Type), Fayetteville, Arkansas. No. 1731, Mandeville and No. 2052 and 2042 Clarkstown, Jamaica, W. I. No. 2805, St. George, Grenada, W. I.

The material from Fayetteville, which was obtained for the most part of the abdomens of several individual hosts, has been taken as the type of this species, while shorter straighter and less characteristic forms were taken from the legs. The material from the West Indies differs somewhat from the type, the distal portion of the perithecium tapering a little more distinctly to the apex, which is thus slightly narrower, and is more often slightly but abruptly bent, two of the lips-cells being more prominent than the others, and giving the extremity a more snout-like habit.

A further variation, in which the distal portion of the perithecium is more or less prominently recurved, has also been found on West Indian material of *P. ciliata*: No. 1916, Porous, Jamaica; Nos. 2805 and 2810, St. George, Grenada; also on a specimen collected by Mrs. J. B. Rorer at Bocas del Toro, Panama. This form always occurs near the base of the left wing, and is larger than the type, measuring up to 275μ or more in length. The venter of the perithecium is often more distinctly narrowed distally and may measure $100 \times 38 \mu$, the recurved distal portion measuring about $80 \times 14 \mu$. The portion comprising the receptacle and the perithecial base, is also relatively longer, as compared with the type.

A still more striking departure from the short stout Type is seen in a variety which occurs near the base of the legs. This variation is characterized by its more slender and elongate habit, attaining a total length of nearly 300μ , and being more or less evenly curved, as a rule, from base to apex. The venter of the perithecium is more or less symmetrically inflated, and the tip is usually distinguished by a rather abrupt, though slight, subterminal bend. The cells of the receptacle are much elongated, and almost all individuals are slightly twisted, so that one views the receptacle edgewise in most preparations. Material of this variety has been examined from Mandeville and Clarkstown, Jamaica, Nos. 1732 and 2055, the latter on *P. decipiens*, the former on *P. ciliata*; also from St. George, Grenada, Nos. 2805 and 2610, on *P. ciliata*.

Stigmatomyces Jamaicensis nov. sp.

More or less suffused with brownish amber, paler below. Form as a rule relatively short and stout. Basal cell of the receptacle hyaline, somewhat longer than broad, obliquely separated from the subbasal, which is usually slightly longer, or may be similar or even shorter, its distal septum horizontal. Stalk-cell of the appendage relatively large, extending nearly to the basal cell of the receptacle, or even slightly overlapping it; long-triangular, distally broader than the base of the appendage, prominently rounded externally, more deeply suffused: axis of the appendage consisting of four cells, all bearing antheridia superposed in a single series, its outer margin becoming strongly convex; its insertion usually oblique, lying on a level with the base of the venter of the perithecium, its basal cell relatively small, short, deeply colored, bearing three superposed antheridia, and often considerably overlapped externally by the subbasal cell; which is considerably longer, externally convex, giving rise distally and inwardly to three, or sometimes two, antheridia: the third cell similar, but slightly smaller, and bearing two antheridia, while the uppermost bears one, and is followed by two which are superposed, the terminal one spinose externally. Stalk-cell of the perithecium but slightly larger than the nearly triangular secondary stalk-cell, from which it is obliquely separated by a strongly curved septum, and which it separates from the subbasal cell of the receptacle by an abrupt narrow external prolongation: the three basal cells of the perithecium hardly smaller, subtriangular in outline, their bases horizontal and nearly coincident. Perithecia asymmetrical rather stout, straight or usually bent inward, the wall-cells having a slight spiral twist from left to right which is more conspicuous in the short stout neck; the venter relatively larger, its margin nearly straight, its outer strongly convex; the terminal portion irregularly bluntly conical; the neck, tip and apex hardly distinguished by slight elevations and depressions, the lips slightly oblique, rather broad, and hardly prominent. Spores $30 \times 4 \mu$. Perithecia $80-115 \times 28 \mu$. Appendage $60-75 \times 12 \mu$, its stalk-cell $30-50 \times 10-12 \mu$, its basal cell $8-10 \mu$. Receptacle $38-46 \times 15-18 \mu$. Length to base of appendage $60-70 \mu$. Total length to tip of perithecium $135-195 \mu$.

On *Paralimna ciliata* Cress. Clarkstown, Jamaica, W. I. No. 2054 at base of wings; No. 2056 on posterior legs.

This somewhat nondescript type, of which the larger individuals occurred at the base of the left wing, seems sufficiently well distin-

guished from depauperate forms of other species on this host, by the terminal twist of its perithecium, and the character of its appendage, which is more like that of *S. curvirostris*; but is somewhat more highly developed, broader, with more cells and antheridia, the latter turned toward the perithecium, the insertion of which is just opposite the base of the ascigerous cavity. The locality mentioned is the only one from which this form has been obtained, although large numbers of the same host have been examined from other sources.

***Stigmatomyces brevicollis* nov. sp.**

Short and more or less distinctly curved throughout, rather uniformly suffused with dull amber-brown, except the paler receptacle and hyaline apex. Receptacle relatively short and slender, slightly and evenly suffused with dirty yellowish; the basal cell longer and distally somewhat broader than the subbasal cell, often distinctly narrower at its base. Stalk-cell of the appendage rather short and broad, its external margin usually straight, slightly prominent below the rather narrow insertion of the appendage. Appendage rather strongly curved, relatively long, slightly exceeding the venter, the basal cell twice as long as broad, the antheridia turned sidewise, large, prominent; the lower markedly divergent, with straight prominent necks; two arising from the basal and from the subbasal cells and one from the third; the series ending in a single terminal member. Stalk-cell of the perithecium distinctly larger than the cells above, the general region short and hardly broader than the distal end of the subbasal cell. Venter of the perithecium relatively long, hardly inflated; its diameter nearly the same throughout, longer than the distal portion; the neck short and relatively very broad, sometimes hardly distinguished, sometimes subtended by a slight prominence of the venter wall-cells: the tip and apex diverging inward somewhat abruptly, so as to form an external rounded hunch-like elevation, but not otherwise distinguished; shorter than the neck, truncate-conical: the apex hyaline but not otherwise distinguished; the lips not at all, or but very slightly, prominent. The wall-cells of the venter neck and tip forming a continuous spiral twist of less than one turn, which is often clearly defined, but is not accentuated by any ridge or furrow. Spores $35 \times 3.5 \mu$. Perithecia $85-95 \mu$; venter $55-64 \times 28-34 \mu$; the neck $\times 18 \mu$. Appendage $50-52 \times 8 \mu$. Receptacle $42-54 \times 14-16 \mu$. Total length to tip of perithecium $140-170 \mu$.

On the head, thorax and legs of species of *Psilopa*. No. 1858 (Type)

and 1874, Balaclava, Jamaica. Nos. 1812 and 1813, Fayetteville, Arkansas.

In general appearance this small and rather insignificant form resembles *S. Ochtheroideae* and *S. humilis*, but differs in its three celled appendage, spiral wall-cells and in other details. The material from the West Indies and from Arkansas is abundant, and does not differ essentially.

***Stigmatomyces indentatus* nov. sp.**

Receptacle uniformly hyaline or faintly yellowish, usually straight, and often tapering from its rather broad distal end to its narrow base, the septum very slightly oblique, and associated with a variably distinct slight indentation; the two cells nearly equal, or the subbasal much longer, in which case it is of nearly uniform width throughout. Stalk-cell of the appendage dark amber-brown and strongly and abruptly concave externally, yellow on its inner side, inserted on a shelf-like protrusion of the subbasal cell opposite the distal septum of the latter; its position, in connection with its concavity, resulting in a characteristic constriction or indentation of this region: its distal end but slightly broader, and inconspicuously prominent below the rather broad insertion. Appendage concolorous with the venter of the perithecium and reaching hardly beyond its upper third; consisting of four successively smaller cells; the basal hardly longer than broad; the three lower bearing each two antheridia, with necks diverging in a double series; the fourth bearing a single one, which is followed by one which is terminal and externally spinose; the appendage usually lying flat against the perithecium. Stalk-cell of the perithecium, and the four cells above it, relatively small, more or less similar; their external margins nearly even, concolorous with the venter of the perithecium. Venter usually somewhat longer than the distal portion, relatively large, straight; its axis bent slightly inward, its surface inconspicuously granular, more clearly so distally, regularly ovoid, or narrower distally, and then slightly broader at its junction with the base of the neck; which is straight or slightly curved, distinctly paler above its slightly spreading base; the tip more distinctly colored, hardly distinguished, one or both of its margins slightly concave, nearly twice as long as the apex; which is almost hyaline, often bent abruptly outward, the lips subsymmetrical, distinct, but not very prominent. Spores $24 \times 4 \mu$. Perithecia $120-147 \mu$; the venter $70-77 \times 35-42 \mu$.

Receptacle $85-125 \times 22 \mu$. Appendage 42μ . Total length to tip of perithecium $210-315 \mu$.

On the superior surface of the abdomen, near the tip, of *Psilopa* sp., No. 1808b, (Type), Fayetteville, Arkansas. In the same position on *Psilopa* sp., No. 2496, Orizaba, Mexico, (Mann).

This species is clearly distinguished from other forms with four-celled antheridia by the shape and position of the stalk-cell of the appendage, the abrupt external concavity of which causes the individual to appear constricted in this region. The Mexican specimens agree in all respects with those from Arkansas, which are abundant and in good condition.

Stigmatomyces Ochtheroideae nov. sp.

Rather strongly curved throughout and somewhat deeply suffused with dull amber-brown. Receptacle relatively short and slender, straight or slightly curved, the basal cell tapering somewhat below, sometimes finely transversely punctate, distally somewhat broader than the base of the much shorter subbasal cell. Stalk-cell of the appendage overlapping the subbasal cell for about one third of its length, rather short and broad, evenly convex externally, but otherwise not prominent below the insertion of the appendage, which occupies its whole distal surface. Appendage lying sidewise, or with the antheridia turned outward, relatively large, short and compact; consisting of four successively smaller cells; the basal relatively large, short, much broader distally; bearing, like the subbasal, two stout divergent antheridia; the two distal cells bearing one each, and followed by a seventh terminal one, which bears a small spine near its base. Stalk-cell of the perithecium and the cells above it, more or less uniform, with somewhat rounded outlines; the secondary stalk-cell and the external basal cell above it individually prominent; the whole region compact, becoming distally even broader than the base of the venter through abnormal thickening of the external walls. Venter of the perithecium transversely mottled or granular, hardly if at all inflated, about twice as long as broad, the base of the stout neck abruptly spreading, and not distinguished at its line of junction; the broad stout tip bent rather abruptly inward, subtended externally by a more or less abrupt distal external elevation of the neck; the apex short, stout, somewhat shorter than the tip, not at all distinguished from it, and tapering to the rather broad, asymmetrical,

slightly sulcate termination; the lips rounded, the outer much broader and somewhat more prominent. Spores $36 \times 4 \mu$. Perithecia $100-110 \times 30-35 \mu$. Appendage $45-50 \times 16 \mu$. Receptacle $55-65 \times 14-16 \mu$ just below the septum. Total length to tip of perithecium $150-175 \mu$.

On the superior surface of the thorax of *Ochtheroidea* spp., No. 2826, Port of Spain, Trinidad, B. W. I.: No. 2519, Bocas del Toro, Panama, (Rorer). No 2062, Grenada, B. W. I.

In general form this species resembles *S. humilis*, *S. borealis* and *S. brevicollis*, but differs in the character of its appendage and in other minor points. The mottling of the perithecium is clearly seen with higher magnifications, and in the Trinidad specimens the basal cell is transversely punctate, and less clearly so in those from Grenada, although in the single specimen from Panama this cell is unmodified.

***Stigmatomyces compressus* nov. sp.**

Erect, usually straight, rather deeply suffused with clear amber-brown, except the hyaline receptacle; which is often slightly bent, its anterior margin more or less strongly convex, its distal end sometimes conspicuously broader than the base of the subbasal cell; which is separated from it by a usually slightly oblique septum, and is distinctly shorter, its distal margin oblique. Stalk-cell of the appendage concolorous with the more deeply suffused venter of the perithecium, relatively large and stout, abruptly prominent above the subbasal cell, which it overlaps one third, or usually much less, and below the insertion of the appendage; which is rather broad and distinguished by a deeply suffused concolorous septum. Appendage rather stout; consisting of four cells successively slightly smaller; the basal and subbasal bearing two, while the two upper bear single antheridia, the series ending in a terminal one with an external spine. Stalk-cell of the perithecium flattened, five-sided, obliquely separated from the subbasal cell of the receptacle; the cells above it more or less uniform, slightly smaller, subtriangular, the two external ones with somewhat convex margins: venter straight, erect comprising about one half the total length of the perithecium, almost symmetrically inflated, its surface granular or irregularly mottled, sometimes with indistinct small elevated patches: the neck abruptly distinguished, stout, spreading slightly at the base, as well as distally below the tip; which is thus rather clearly distinguished, as broad as the mid-portion of the neck;

the apex more than half as long, not at all distinguished, distally abruptly compressed with rounded margins, the broad termination bearing four minute abruptly distinguished papillate lip-terminations, which are rather distant, and almost symmetrically placed around the pore. Spores $30 \times 3.8 \mu$. Perithecia $120-140 \times 38-42 \mu$, maximum $150 \times 48 \mu$. Appendage about 55μ . Receptacle $70-100 \times 16 \mu$, maximum $120 \times 20 \mu$. Total length to tip of perithecium $220-280 \mu$, maximum 310μ .

On legs and wings of *Psilopa* spp., No. 1725, (Type), Mandeville; Nos. 1855 and 1875, Balaclava, Jamaica, W. I. On base of wing of *Ochthoidea glaphropus* Loew., No. 1710, Mandeville, and No. 1920, Porus, Jamaica.

This species is not unlike *S. rugosus* in appearance, but differs in its four-celled appendage and abruptly compressed papillate apex. The surface of the perithecium is usually rather finely granular-mottled, sometimes with a tendency to produce slightly elevated mottled patches about as large as the verrucosities of *S. rugosus*. In older specimens the wall-cells of the venter may show a slight obliquity, and their distal ends may be somewhat prominent, forming an indistinct ridge below the spreading base of the neck.

STIGMATOMYCES MICRANDUS Thaxter, var. **Atissae** nov. var.

I have separated under this varietal name a form which grows on very minute dark species of *Atissa* in the West Indies, occurring more often on the upper surface of the head, or the adjacent superior surfaces of the thorax, or on the bases of the antennae, usually forming a conspicuous group in these positions, while not infrequently it may be found growing on the legs. I have never seen it, however, on the abdomen which was the position occupied by the type-form on its undetermined papuan host. The general form of the variety and its peculiar three celled appendage correspond closely to that of the type; the venter of the perithecium is either smooth or finely rough-granular, never verrucose, and the granulation may involve the neck as in *S. Psilopae*. In many cases the junctions of the wall cells of the venter are clearly indicated by slightly twisted ridges which, however, cannot always be clearly distinguished. The conformation of the distal portion of the perithecium is similar in general to that of the type, although the peculiar modification of the apex about the pore is less well marked than is indicated in the original figures (Monograph, II,

Plate XLVI, fig. 24). The variety is smaller than the type, the average length in well developed individuals being about 180μ , the maximum hardly more than 200μ . Abundant material has been examined from the following sources, in all cases from species of *Atissa*. Nos. 1737 (Type), 1717 and 1738, Mandeville; No. 1917B, Battersea, and No. 2042 from Clarkstown, Jamaica, W. I. Nos. 2803-2804, St. George, Grenada: these numbers representing numerous individual hosts.

***Stigmatomyces Psilopae* nov. sp.**

Variably elongate, sometimes rather short and stout, wholly suffused with brownish yellow or amber-brown, except the hyaline receptacle. Receptacle straight or slightly curved, but slightly broader distally, the two cells usually of about equal length. Stalk-cell of the appendage relatively short and broad, its base hardly overlapping the subbasal cell, distally prominently rounded outward below the insertion. Appendage rather stout and compact, the axis consisting of four cells and bearing eight antheridia, their short slightly curved stout necks directed outward, or slightly sidewise; the terminal one bearing a conspicuous spine on its inner side at the base of its neck; the fourth cell of the axis bearing a single antheridium; the three lower each two; the basal cell somewhat larger than the others, narrower below. Cells of the stalk- and basal cell region more or less uniform in size, the outer somewhat prominent: venter of the perithecium becoming normally verrucose, the verrucosities irregularly disposed, or more or less distinctly transverse, rarely inconspicuous; oval or elliptical in outline, sometimes tapering more distinctly distally, rather abruptly distinguished from the abruptly spreading base of the usually elongate and slender neck; which is typically verruculose, but may be smooth, or only somewhat roughened, of about the same diameter throughout, or tapering slightly distally; its junction with the tip occupied by an abrupt and conspicuous inflation, which is nearly symmetrical on either side: the apex distally very slightly oblique and bearing a crown of four clearly defined somewhat divergent blunt prominences, a fifth, somewhat broader and slightly more prominent, lying between the two outer ones. Spores $35 \times 3.5\mu$. Perithecia: venter $85 \times 42-62\mu$; neck $70-140 \times 18\mu$; tip $28-32\mu$. Receptacle 78μ to very rarely $260 \times 20-25\mu$. Appendage $52 \times 14\mu$. Total length to tip of perithecium $300-435\mu$, the longest 540μ .

On species of *Psilopa*. No. 1853 (Type) No. 1867, Balacava;

No. 1730, Mandeville; No. 1908, and 1909, Williamsfield; No. 1925, Porous; No. 1926, Battersea and No. 2045, Clarkstown, Jamaica, W. I. No. 2806, St. George, Grenada, W. I.

In general form and in the verrucosity of the venter of its perithecium, this species is similar to *S. micrandrus*, to which it is nearly related. It differs chiefly in its constantly four-celled appendage, its usually verruculose neck, and in the conformation of its apex. An abundant series of specimens has been examined.

On species of *Ilythea*, from the West Indies, Kamerun, Borneo and New England, I have obtained a form which, although subject to great variation, does not seem satisfactorily divisible into more than one species. The variations, however, are such, except as regards the appendage, that it is almost impossible to give a composite diagnosis which would be satisfactory. These variations are apparently in part regional, in part due to differences in position of growth, and in all probability to some extent are owing to differences in the hosts; although the latter do not vary very greatly. I have therefore selected as the Type the most characteristic variation, which has been found on the thorax, only, of a new species of *Ilythea* from Jamaica, and have appended notes on the more important deviations from this type that have come under my notice.

***Stigmatomyces Ilytheae* nov. sp.**

Receptacle contrasting with the more or less uniform suffusion of the parts above, quite hyaline, or becoming very faintly yellowish, very stout and thick walled; of almost uniform width, or but slightly narrower at the rounded base; the minute foot sometimes lateral; the subbasal cell somewhat longer than the basal. Stalk-cell of the appendage somewhat obliquely related to the subbasal cell, and occupying more than one third of its width; stout, hardly longer than broad, externally very slightly convex or almost straight, but distally rounded and protruding conspicuously below the insertion. Appendage consisting of five cells, relatively short and broad, tapering more or less uniformly to the erect terminal antheridium, which bears a spine sublaterally at the base of its erect neck: the basal cell deeply tinged with amber-yellow, concolorous with the stalk-cell, the walls of both clear amber-brown, small, short, subtriangular; the rest of the appendage paler; the fifth cell producing a single antheridium, while

all the rest produce two; the series directed somewhat sidewise and outward, the necks small, somewhat appressed in two rows, but slightly curved. Stalk-cell of the perithecium broad, flattened, subtriangular, paler and usually larger than the cells above it; which are subequal, somewhat rounded, the external basal cell somewhat prominent externally, with thickened wall. Perithecium smoky brown throughout; the venter more deeply, suffused, straight, erect, hardly inflated, longer than the distal portion, of more or less even diameter throughout or somewhat broader distally; the neck diverging or curved outward more or less distinctly, more or less abruptly distinguished, its abruptly spreading base slightly asymmetrical; the tip slightly narrower; the two outer lips slightly prominent, the inner forming a small but characteristic subtriangular prominence, the distal free margin of which is horizontal and nearly straight, on a level with, or slightly lower than the outer lip-edges, while its outer (posterior) margin curves abruptly inward to a minute hyaline papilla which subtends it. Spores $35 \times 3.5 \mu$. Perithecia $175-192 \mu$; the venter $70-98 \times 28-42 \mu$. Appendage $56 \times 16 \mu$. Receptacle $100-110 \times 30 \mu$, the smallest $56 \times 28 \mu$. Total length to tip of perithecium $210-300 \mu$.

On the superior surface of the thorax of *Ilythea* sp. No. 1907 (Type) Williamsfield, and No. 2043f, Clarkstown, Jamaica, W. I.

Variations from the type-form above described may be distinguished as follows.

Var. a. From Clarkstown, Jamaica, No. 2043e, on the upper, surface of the abdomen and thorax, measuring $280-350 \mu$ in length, the perithecium straight or slightly curved, the distal portion much longer, even twice as long as the venter, and long-conical, the tip slightly distinguished on both sides, the lips forming a more prominent median short termination, symmetrically subtended on either side by shorter projections.

Var. b. No. 2043d, from the same locality, is similar except that the distal portion of the perithecium is relatively somewhat shorter and describes a sigmoid curve.

Var. c. No. 2064, from St. George, Grenada (Brues and Allen), growing on the upper surface of the thorax, has a receptacle about as broad as the venter of the perithecium; which is slightly and symmetrically inflated and broader distally, where it is abruptly distinguished from the very long and more slender distal portion, which terminates in a fashion similar to that of varieties a and b.

Var. d. No. 2043d on the anterior legs of an *Ilythea* from Clarks-

town, Jamaica, is long and slender and evenly curved throughout; the receptacle relatively slender and tapering below, the perithecium long; the outer wall-cells more conspicuously shorter than the inner, the neck slender and longer than the venter, from which it is not very abruptly distinguished, characteristically and slightly geniculate at its junction with the tip; the apex not at all distinguished, the termination unlike either of the preceding forms, the outer lips broad and rounded, the inner forming a minute papilla placed somewhat lower. Unlike other individuals from the legs, this variety attains a considerable length, measuring up to $315\ \mu$ in length.

Var. e. A single specimen, No. 2643, from Kamerun, West Africa, is very long and slender, the venter short and inflated, with indications of distal elevations which alone serve to distinguish the elongate, slender distal portion, the base of which tapers gradually, becoming then nearly uniform in width to the very apex, which is modified much as in var. a and b.

Var. f. No. 2043b from Clarkstown, Jamaica and occurring on the legs, is a shorter stouter form, measuring about $260 \times 45\ \mu$; the perithecium and receptacle of about equal length, the latter but slightly smaller than the former, both tapering more or less uniformly to the pointed base and apex, the outer and inner lips equally broad, not prominent, the inner slightly lower.

Var. g. No. 2132, from Sarawak, Borneo, a still smaller and more compact form, the longest measuring $150 \times 25\ \mu$, growing at the tip of the abdomen, the perithecium tapering throughout to the rather blunt extremity, the lips slightly prominent and more or less similar; the appendage four-celled, a condition which is occasionally found, especially in more depauperate forms of the other varieties.

Var. h. No. 1305, on *Ilythea spilota* Curtis, collected at Kittery Point, Maine, is similar in general form to Var. f, measuring from 190 – $200\ \mu$, the perithecium about $120 \times 35\ \mu$, and longer than the receptacle. The appendage is apparently always four-celled, and the color slightly different, but otherwise it possesses no distinctive characters.

Stigmatomyces Chilensis nov. sp.

Receptacle rather stout, nearly uniform, hyaline, becoming faintly suffused; the basal cell very slightly inflated distally; the subbasal distinctly longer, slightly broader distally than the stalk-cell region of the perithecium. Stalk-cell of the appendage amber-brown, con-

colourous with the venter and basal cell region of the perithecium; relatively short and stout, its base rather broad and hardly oblique, its outer margin straight, its distal margin but slightly broader than the very broad insertion of the relatively large appendage. Appendage becoming more deeply suffused with a faint smoky brown tinge, its axis consisting of five short cells of about equal length, except the fifth which is somewhat smaller; bearing ten rather crowded antheridia, their large prominent, nearly straight necks directed obliquely outward, one terminal without visible spine, often reaching to the distal end of the venter, one from the fifth axis-cell and two from each of the others. Stalk-cell of the perithecium longer than broad, pale, subtriangular, its outer and upper inner angles broadly rounded; somewhat larger than the secondary stalk-cell, which is similar in form; the basal cells relatively large, the outer distally prominent beyond the base of the venter, its outer margin somewhat concave. Venter straight, rarely slightly inflated, the margins usually straight and diverging slightly, the distal end which is faintly striate or punctate, thus distinctly broader than the base, and marked by four conspicuous flat rounded elevations, variably prominent and corresponding to the four wall-cells: the slightly spreading base of the very stout neck thus abruptly distinguished, about equal to the venter in length, distally slightly enlarged, more distinctly so externally, so that the very slightly narrower tip and apex are more or less clearly distinguished from it: the hyaline and distally somewhat oblique apex not at all distinguished; the tip very slightly inflated distally, so that its lower margin is somewhat concave, especially externally; the rounded outer lips broader and more prominent than the inner. Spores $30 \times 3 \mu$. Perithecia $130-160 \mu$, largest 192μ : venter $55-64 \times 28-32 \mu$ at base $\times 35-42 \mu$ at apex. Appendage $52-60 \times 18 \mu$. Receptacle $90-140 \mu$, the longest 160μ . Total length $250-300 \mu$, the longest 400μ .

On the legs and abdomen of a species of *Discocerina*, No. 1464, vicinity of Concepcion, Chile, Nov. 1905.

Although the conformation at the tip of the perithecium in this species suggests that of the less well marked forms of *S. Discocerinae*, and its venter is not unlike that of *S. Caribbeus*, both of which occur on flies of the same genus, it is very clearly distinguished from either by its large coarse five-celled appendage. Abundant material has been examined, the individuals showing little variation except in size.

Stigmatomyces Discocerinae nov. sp.

Typical form relatively short and stout, rather deeply suffused with dirty amber-brown, except the nearly hyaline or slightly yellowish receptacle. Receptacle more or less uniform and abruptly distinguished as a stalk-portion from the parts above; the basal cell usually longer, its lower third often curved, tapering to the pointed base; the subbasal cell often but slightly longer than broad, separated from the basal by a more or less evident constriction, its outer membrane usually, but not always, more or less conspicuously crinkled or corrugated, the surface sometimes appearing transversely striate. Stalk-cell of the appendage relatively short, its broad base slightly oblique, its distal end somewhat broader, but not conspicuously bulging outward below the broad insertion of the appendage. Appendage short, compact, bearing a terminal spinose antheridium and five or seven others, according as the axis consists of three or four small cells; the basal similar, or but slightly larger than the others, and concolorous; the terminal cell bearing one, the rest two, antheridia; their necks short and stout, and directed sidewise; the appendage lying flat against the perithecium. Stalk-cell of the perithecium broad, five-sided, larger than the cells above it; which are subequal, except the secondary stalk-cell, which is small and externally slightly prominent; the outer basal cell above it externally slightly concave, its curvature continuous with that of the inflated base of the venter. Venter oval or elliptical in outline, usually strongly and symmetrically inflated, darker, the surface inconspicuously finely granular-mottled, with a tendency to transverse striation; the broad spreading base of the short neck abruptly distinguished, the margins of the latter more or less concave, owing to a variably developed, but typically conspicuous, distal enlargement which subtends the tip; the margins of the tip also more or less distinctly concave, owing to a second variably prominent distal enlargement at its junction with the apex; the latter stout, its distal margin broad, slightly oblique when viewed sidewise, with relatively large but not very prominent papillate lips. Spores $30 \times 3 \mu$. Perithecia $95-105 \times 30-35 \mu$. Appendage $30 \times 12 \mu$. Receptacle $35-55 \times 12-15 \mu$. Total length to tip of perithecium $125-175 \mu$.

On species of *Discocerina* usually on the legs or thorax. Nos. 1848 (Type) and 1846, Balaclava; Nos. 1716 and 1727, Mandeville; No. 1923, Porous, and No. 2045, Clarkstown, Jamaica, W. I.; No. 2316,

Port of Spain, Trinidad, B. W. I.; the material derived from numerous individual hosts.

A form growing on a somewhat larger species of *Discocerina* from Balaclava, Jamaica, No. 1847, is larger and more slender, the total length reaching $235\ \mu$, the receptacle $85\ \mu$. The distal portion of the perithecium lacks the characteristic double elevation, and the receptacle is of a nondescript type. It can however hardly be assigned to any other species. The present form is perhaps most nearly related to *S. pauperculus* from which it differs in the form of its perithecium and receptacle while it also lacks the deeply colored contrasting basal cell which distinguishes the appendage of the papuan form.

***Stigmatomyces Caribbeus* nov. sp.**

Pale, slightly sigmoid. Receptacle tapering slightly throughout, the basal cell shorter and more or less distinctly curved: stalk-cell of the appendage almost a pointed oval, its point slightly overlapping the subbasal cell, its protruding outer margin evenly curved throughout, the insertion broad. Appendage tapering, consisting of three cells, bearing six relatively large antheridia directed sidewise, a terminal one, two each from the basal and subbasal, and one from the upper of the three axis-cells; the subbasal cell relatively large, longer than the basal, its margin evenly convex, that of the smaller third cell somewhat less so. Cells of the basal cell region subequal, the stalk-cell somewhat larger and triangular, the outer basal cell and the secondary stalk-cell both protruding independently and conspicuously, especially the former, which bulges beyond the base of the venter. Venter straight, pale, the wall-cells ending in a corresponding number of clearly defined, distal, somewhat asymmetrically placed elevations, which serve abruptly to distinguish the abruptly spreading base of the neck; which is otherwise rather stout and nearly uniform, usually more or less strongly curved outward, hardly distinguished from the tip and apex; which are but slightly if at all narrower, or may be even slightly inflated distally, the distal margin of the almost equally broad apex often flat truncate, or slightly asymmetrical when viewed sidewise; the lip-cells forming inconspicuous flattish papillae. Spores about $30 \times 3\ \mu$. Perithecia $122\text{--}140\ \mu$; the venter $70 \times 32\ \mu$; the neck $65\text{--}70 \times 10\text{--}12\ \mu$. Appendage $40\text{--}50\ \mu$. Receptacle $70\text{--}100 \times 15\text{--}20\ \mu$. Total length to tip of perithecium $210\text{--}265\ \mu$.

On the abdomen of species of *Discocerina*. No. 2518, (Type),

Bocas del Toro, Panama, (Rorer); No. 2053, Williamsfield and No. 2044, Clarkstown, Jamaica, W. I.

This appears to be a very rare species, since it has been obtained in only three instances among the very large number of hosts examined from the West Indian region. The appearance of its venter recalls that of the simpler forms of *S. constrictus*, but its form is otherwise different and the appendage is of quite another type.

***Stigmatomyces ambiguus* nov. sp.**

Nearly straight to the distal end of the venter, above which the distal portion of the perithecium is more or less strongly curved or bent inward. Receptacle more or less uniform throughout, slightly broader at the horizontal septum; the basal cell nearly hyaline, slightly narrower below; the subbasal distinctly suffused, shorter or slightly longer than the basal. Stalk-cell of the appendage more deeply suffused with dull amber-brown, concolorous with the uniformly suffused perithecium, its base slightly overlapping the subbasal cell, rather short and broad, prominently rounded below the rather broad insertion. Appendage relatively large and stout, about as long as the venter consisting of four successively slightly smaller cells; the basal rather large, somewhat longer than broad, concolorous with the stalk-cell; the three lower cells bearing each two antheridia, the fourth a single one followed by a terminal one; the antheridia rather large with prominent nearly straight necks turned outward, or somewhat side-wise, and divergent. Stalk-cell of the perithecium rather small, rounded distally, its base straight and oblique; the cells above it but slightly smaller, more or less uniform, somewhat less deeply suffused than the rest of the perithecium. Venter straight, its surface indistinctly transversely irregularly granular-punctate, nearly symmetrical, but slightly inflated: neck about as long as the venter, curved or bent inward, concolorous, less conspicuously granular-punctate; stout, but clearly distinguished above its slightly but abruptly spreading base; somewhat broader distally below the slightly but abruptly distinguished short tip, which is not distinguished from the much shorter apex; the margins of the two slightly and nearly symmetrically convex; the apex broad, subtruncate and slightly oblique distally, the lips hardly distinguished. Spores about $35 \times 3.5 \mu$. Perithecia $140-155 \mu$, the venter $60-70 \times 30-32 \mu$. Receptacle $88-105 \times 21 \mu$. Appendage $60 \times 15 \mu$. Total length to tip of perithecium $210-280 \mu$.

On *Ochtheroidea* sp., No. 2062b (Type), St. George, Grenada, W. I., at base of right wing. On *Psilopa* sp. on wing, No. 1387, Island of Margarita, Venezuela (Blakeslee).

The specimens from the two localities above mentioned are absolutely identical, and seem well distinguished from other forms which occur on related hosts. Its nearest ally appears to be the rather variable *S. Discoccrinae*, which is distinguished by its normally shorter more compact appendage, uniformly hyaline receptacle indented at the septum and differently developed perithecium.

STIGMATOMYCES DUBIUS Thaxter.

A form that seems to correspond so closely to this species that I am unwilling to separate it specifically, has been found growing on the legs of *Ochthera exsculpta* Loew., No. 2807, St. George, Grenada, B. W. I. It corresponds in general form with the New Guinea types from Ralum, New Pommerania, which were obtained from a fly allied to *Ochthera* and possibly belonging to this genus. In the West Indian form, the appendage consists normally of eight cells, of which the seventh is spinose. The tip of the perithecium also, is more abruptly distinguished from the neck, while the lips are hardly prominent and lack entirely the tongue-like prolongations of the type.

STIGMATOMYCES GRACILIS Thaxter.

I refer to this species, also with some hesitation, a form which occurs on the abdomen and at the base of the posterior legs of *Ochthera mantis* De G., from Fayetteville, Arkansas, Nos. 1802 and 1803. The appendage is terminated by a spinose antheridium, and, although it consists of usually six cells, instead of five as in the New Guinea material, is otherwise identical. The general form of the individuals from the abdomen is stouter, curved, or with the axis of the perithecium directed inward at an angle to that of the receptacle, while the tip is much less abruptly distinguished from the neck. The apex may be exactly similar in both; or more or less well developed, slightly divergent, ear-like projections may be present at maturity from the outer lip-cells. These projections, however, may be quite undeveloped. The individuals growing at the base of the posterior legs,

however, are longer more nearly straight and slender. Until an opportunity occurs to examine and compare material on *Ochtherae* from other localities, it seems undesirable to separate either of these Western Hemisphere forms from the Papuan types.

***Stigmatomyces Ochtherae* nov. sp.**

Relatively short and stout, curved or sometimes straight. Receptacle subhyaline, the cells thick-walled, the basal broadly rounded below, shorter than the subbasal, somewhat longer than broad. Stalk-cell of the appendage rather deeply colored, dull brownish, concolorous with the perithecium; relatively large, subtriangular, short and stout, as broad as long, very prominent, overlapping the upper fourth to half of the subbasal cell; its inner margin almost coincident with that of the receptacle; its nearly flat or slightly rounded distal surface more than twice as broad as the rather narrow insertion of the appendage. Appendage relatively large and broad, usually curved against the side of the perithecium, with the antheridia directed outward; consisting of five to seven cells, the upper bearing a single antheridium followed by a terminal one; the remainder two each, the necks small, slightly curved, not prominent; the basal cell deeply colored, short, cup-shaped. Stalk-cell of the perithecium broader than long, paler and larger than the cells above it, which are concolorous with the perithecium. Venter of the perithecium short, hardly inflated, the neck not at all or very slightly distinguished, considerably longer, very broad, its inner margin concave below, becoming straight, its outer somewhat convex, abruptly so where it joins the tip, and sometimes swollen in this region so that its diameter may equal that of the venter: the tip short, its outer margin bending inward almost at right angles, but otherwise hardly distinguished, very short, the hyaline lips forming an abruptly papillate termination close to the inner margin. Spores about $35 \times 3.5 \mu$. Perithecia $100 \times 31\text{--}35 \mu$. Appendage $70\text{--}85 \times 15\text{--}20 \mu$. Receptacle $66\text{--}85 \times 18\text{--}25 \mu$. Total length to tip of perithecium $160\text{--}180 \mu$.

On the superior surface of the abdomen, near the tip, of *Ochthera* sp., No. 1760; Balaclava, Jamaica, W. I.

This species is perhaps as nearly allied to *S. gracilis* in the character of its appendage, as to any other forms, but is so peculiar that it is sufficiently unmistakable. The swollen end of the perithecium gives it a characteristically hunched appearance quite unlike that of any known species.

Stigmatomyces borealis nov. sp.

Slightly bent in the middle, rather small and stout, the clear hyaline receptacle contrasting with the clear amber-brown or yellow uniform suffusion of the portions above; the basal cell becoming slightly suffused with brownish at maturity, the suffusion involving the base of the subbasal cell. Receptacle rather short, the posterior walls distinctly thicker, slightly broader at the septum, the basal cell tapering throughout to the foot, more than twice as long as the subbasal, which is usually hardly longer than broad, and separated by a slightly oblique septum. Stalk-cell of the appendage overlapping the subbasal cell slightly, short, its external margin slightly concave, distally somewhat broader than the insertion. Appendage lying flatwise against the perithecium, with the insertion somewhat above the base of the ascigerous cavity; erect, somewhat tapering, as long or nearly as long as the venter, consisting of three cells; the basal slightly longer than broad, the subbasal but slightly smaller and subtriangular, both bearing two closely associated antheridia with short somewhat divergent necks; the third smaller and bearing a single antheridium, followed by the terminal one which bears a small spine. Stalk-cell and secondary stalk-cell of the perithecium nearly equal and similar, flattened subtriangular and relatively small, the latter wholly separated from the subbasal cell; the basal cells of the perithecium smaller, uniform, hardly protruding. Perithecium stout, usually considerably larger than all the other portions combined, more or less strongly falcate, the inner margin slightly concave, the outer strongly convex; the venter relatively large and broad, tapering to the hardly differentiated distal portion; the neck distinguished by a scarcely perceptible contraction, half or less than half as long as the venter; the tip slightly distinguished, more clearly so externally, much shorter than the wholly undifferentiated apex which tapers to a blunt point, the outer lips forming a slight angular prominence. Spores $34 \times 3.5 \mu$. Perithecia $96-110 \times 30-40 \mu$. Appendage 48μ . Receptacle $60-85 \times 22-24 \mu$. Total length to tip of perithecium $150-200 \mu$.

At the base of the posterior legs of *Parydra imitans* Loew., No. 1372, Kittery Point, Maine.

Of the sixteen individuals which have been examined and include fully matured conditions, one is much more slender and elongate than the others, which are very uniform, and measures 265μ in total

length. The species is of a mondescript type without well marked distinguishing peculiarities, yet I am unable to include it in any of the other species found on Ephydriidae. In general form it resembles *S. humilis*, *S. Ochtheroideae* and *S. brevicollis* which, however, differ in the character of their appendages, as well as in minor points.

***Stigmatomyces lingulatus* nov. sp.**

General habit rather elongate with a slight median twist, arcuate, or even distally recurved. Receptacle pale yellowish, rather long, stout, more or less conspicuously wider in the middle in the region of the septum, the two cells of nearly equal length, the subbasal more often distinctly narrower distally. Stalk-cell of the appendage turned partly sidewise, more deeply suffused, rather short, barely overlapping the subbasal cell, somewhat prominently rounded below the insertion, which lies somewhat above the base of the ascigerous cavity. Appendage persistent, concolorous with the venter; its axis consisting of three cells, the basal twice or somewhat more than twice as long as broad, the subbasal flattened, two sided, both bearing two antheridia; the third smaller and bearing a single antheridium which is followed by the terminal one, the necks of the series of six having a distinct right and left divergence. Stalk-cell of the perithecium small, flattened, subtriangular, paler than the cells above it; which are more or less similar, concolorous with the venter, and not externally prominent. Venter of the perithecium very faintly granular, the inner margin nearly straight, or slightly concave, the outer strongly and evenly convex; the wall-cells terminating in rather inconspicuous individual prominences, which render the transition to the neck abrupt: distal portion of the perithecium considerably longer than the venter, strongly and rather evenly curved; the neck hyaline and narrower below, the distal third and the short undifferentiated tip becoming distally broader; the apex but slightly shorter than the tip, not distinguished, very slightly geniculate, two of the lip-cells combined and prolonged to form a symmetrical tongue-like prolongation tapering to a blunt extremity, and extending free beyond the broader blunt termination of the other two lip-cells. Spores $38 \times 4.5 \mu$. Perithecia; venter $70-80 \times 40 \mu$; the distal portion $90-100 \times 14 \mu$ near the base and $\times 18 \mu$ distally. Appendage $75-80 \times 12-14 \mu$; the basal cell $24 \times 10 \mu$; the stalk-cell 30μ . Receptacle $115-135 \times 24-28 \mu$ in the mid-region. Total length to tip of perithecium 300μ or somewhat more.

On the superior surface of the abdomen of *Parydra humilis* Will. No. 1868, Balaclava, Jamaica.

A species most nearly allied to *S. protrudens* and *S. pinguis*, from which it is abundantly distinguished by the form of its receptacle and perithecium, as well as by the tongue-like development of two of the lip-cells.

***Stigmatomyces pinguis* nov. sp.**

Receptacle stout, subhyaline or pale yellowish; the basal cell tapering slightly below its anterior margin, nearly straight; the posterior more or less convex, distally slightly inflated and more or less distinctly broader than the base of the subbasal cell, which is separated from it by a more or less oblique septum, and is usually from one half to one third as long, becoming broader distally. Stalk-cell of the appendage rather short, darker dull amber-brown, concolorous with the venter and basal cell region of the perithecium; its external margin straight or somewhat concave, overlapping the subbasal cell very slightly, distally protruding somewhat below the rather broad insertion of the appendage, which is slightly higher than the base of the ascigerous cavity of the perithecium. Appendage permanent, uniformly suffused, straight or usually convex on the axis side, lying somewhat obliquely or with the antheridia turned outward; the axis consisting of three cells, the basal distinctly longer than broad, bearing two slightly divergent antheridia from which it is very obliquely separated; the two remaining cells flattened, the subbasal longer and bearing two antheridia; while the third bears only one, which is followed by the single terminal antheridium, the neck of which becomes abruptly curved toward the axis-side. Stalk-cell of the perithecium occupying the whole width of the receptacle, much flattened, subtriangular, paler than the deeply suffused cells above it; which are concolorous with the venter of the perithecium, rather small and irregularly triangular, the outer ones variably prominent. Venter of the perithecium relatively large and stout, coarsely granular, broadly ovoid, the inner margin distinctly more convex; about as long as the distal portion which is strongly and abruptly curved inward in the region of the tip, the neck not very abruptly distinguished, its wall-cells separated by more or less distinct furrows, its spreading base delimited by a horizontal line of separation from the venter; otherwise stout and nearly uniform, or slightly broader where it joins the short tip and apex, which are not otherwise distinguished; the termination

broad, subtruncate, the outer lips more prominent. Spores $28 \times 4 \mu$. Perithecia $120\text{--}135 \mu$; the venter $65\text{--}78 \times 40\text{--}55 \mu$, the neck 16μ in diameter. Appendage about $60 \times 12 \mu$. Receptacle $65\text{--}98 \times 22\text{--}26 \mu$. Total length to tip of perithecium $200\text{--}260 \mu$.

On the under surface of the left wing of *Parydra pinguis* Walk. No. 1805d, Fayetteville, Arkansas.

This species has been found on a single individual only, and is distinguished by its very stout venter and the evenly incurved neck of the perithecium; the appendage convex on the axis side and the neck of the terminal antheridium abruptly bent in the opposite direction, the wall-cells of the neck more or less distinctly prominent and thus separated by corresponding furrows. The species is evidently related to *S. protrudens* and *S. lingulatus*.

***Stigmatomyces protrudens* nov. sp.**

Receptacle subhyaline, relatively stout and of nearly uniform diameter throughout, the basal cell usually bent and slightly narrower just above the foot; longer, sometimes twice as long as the subbasal. Stalk-cell of the appendage relatively short and irregularly triangular, slightly overlapping the subbasal cell, becoming narrower distally below the insertion of the appendage with which it is concolorous, both being more deeply tinged with dull amber-brown than the perithecium and its basal cell region, which are uniformly pale yellowish with slight amber-brown suffusions. Appendage inserted nearly opposite the base of the ascigerous cavity, relatively large and sometimes nearly as long as the venter of the perithecium, lying flatwise against it, usually curved throughout, the axis side concave; its axis consisting of three cells; the basal somewhat longer than broad, shorter than the subbasal, both producing two rather large antheridia, the short stout curved necks of which diverge slightly right and left; the upper cell smaller bearing a single antheridium which is united to the terminal one. Stalk-cell of the perithecium subhyaline, small subtriangular, occupying the whole width of the subbasal cell from which it is somewhat obliquely separated. Secondary stalk-cell and basal cells small, nearly uniform, irregularly triangular, concolorous with the perithecium, the external cells slightly prominent. Venter of the perithecium straight, erect, subsymmetrical, but slightly inflated, somewhat longer, as a rule, than the distal portion, its base not abruptly distinguished from the basal cell region and hardly broader;

neck-portion slightly curved, stout but rather abruptly distinguished, of nearly uniform width the very short, abruptly tapering tip distinguished only by a combined external protrusion from the distal ends of its two outer wall-cells which may be hunch-like or rounded, or form an abrupt rather narrow divergent free projection; the apex very short, the lips not at all prominent, forming together a more or less evenly rounded papilla. Spores $30 \times 4 \mu$. Perithecium $120-140 \times 30-45 \mu$, its protrusion to 16μ . Receptacle $70-100 \times 26 \mu$. Appendage $65-70 \times 15 \mu$, its stalk-cell $25-27 \times 12-14 \mu$. Total length to tip of perithecium $225-275 \mu$.

On the thorax, wings and superior abdomen of *Parydra pinguis* Walk. No. 1805, Fayetteville, Arkansas.

This form is well distinguished by the peculiar subterminal projection from its perithecium. It is not usually in very good condition, having a somewhat shriveled look, but was obtained from several different individuals of its host, and does not vary to any great extent, except in the form and comparative prominence of the subterminal projection.

Stigmatomyces Parydrae nov. sp.

Form short and stout, usually strongly curved, dirty yellowish brown, except the nearly hyaline, or but slightly suffused receptacle. Basal cell of the receptacle usually strongly curved, tapering slightly below, twice to several times as long as the subbasal cell; which is squarish or even broader than long, and similar to, or but slightly larger than, the five more or less similar irregularly subtriangular cells of the stalk and basal cell region. Stalk-cell of the appendage relatively short and stout, slightly narrower below and overlapping the subbasal cell slightly, or not at all; hardly or but slightly prominent below the basal cell of the appendage, which occupies its whole distal surface. Appendage relatively large, somewhat curved inward, lying somewhat obliquely sidewise against the perithecium, the necks of the antheridia very short, stout, bent outward, the axis consisting of normally five, sometimes four cells, all of which, except sometimes the uppermost, bear two somewhat divergent antheridia, the series thus partly double and ending in a single terminal one. Venter of perithecium not distinguished from the basal cell region, both more deeply suffused, its outer margin more strongly convex especially distally where it curves inward to the well distinguished but relatively stout neck-portion; which is much shorter than the venter, distally slightly

broader where it joins the tip, from which it is not distinguished; the tip strongly convex externally, straight or slightly concave on its inner side; the apex very short, hyaline, abruptly distinguished, papilliform, slightly prominent externally above the usually persistent insertion of the trichogyne, its outline more or less evenly rounded, the lips not at all prominent. Spores about $30 \times 4 \mu$. Perithecia: basal and stalk-cell portion about $18 \times 27 \mu$; venter, average $60 \times 35 \mu$, maximum $75 \times 40 \mu$; distal portion about $45\text{--}50 \times 11 \mu$. Receptacle $45 \times 20\text{--}22 \mu$, maximum length 80μ . Appendage typically $60\text{--}70 \times 16 \mu$, sometimes smaller. Total length to tip of perithecium, average 180μ , maximum 225μ .

On legs, wings, and thorax of *Parydra quadrituberculata* Linn., No. 1804, Fayetteville, Arkansas.

Although this species has no very striking peculiarities, it is well distinguished by its stout form, short subbasal cell, large many celled appendage, and stout perithecium; the well distinguished stout neck-portion strongly curved and ending in the small, abruptly distinguished, button-like apex. It varies very slightly, individuals on the wing being somewhat longer.

On Oscinidae.

STIGMATOMYCES CONSTRICTUS Thaxter.

Syn. *S. Elachipterae* Thaxter.

This species, the original host of which from the papuan region was not determined, proves to be characteristic of various genera of the Oscinidae, and an examination of a very large series of specimens leaves no doubt as to its identity with *S. Elachipterae*, which was found on a species of the oscinid genus *Elachiptera* in New Hampshire. It is one of the most variable of all the species of *Stigmatomyces*, and the peculiarly narrowed base of the subbasal cell, which suggested the specific name, proves to be quite as often wholly lacking, as it is present. The general habit may be short and stout in well developed individuals which measure only 150μ in length; while long slender forms occur, which may reach a length of 450μ , although such are not often met with. The type of appendage is always the same, and is very characteristic; but the number of antheridia is subject, as usual, to slight variations. The perithecium, especially its termination,

is in general characteristic in form, but, although it is usually quite smooth, it may as in the case of *S. purpureus*, be modified by variably developed tubercular outgrowths, four vertical double rows of which may be developed on the venter, and which may also involve the neck. Such types are more often found on the wings of the host, and have been obtained on species of *Oscinis* from Mexico, Jamaica and Trinidad, W. I. The material examined includes twenty five numbers: from various localities in Jamaica on species of *Oscinis*, *Siphonella* and *Hippelates*; two numbers from Bocas del Toro Panama, on *Siphonella* and *Oscinis*; one number on *Siphonella* from the Grand Etang, Grenada, W. I.; five numbers on Oscinidae from Trinidad, W. I., and eight numbers from Kamerun on Oscinidae, of which one, only, the very beautiful and peculiar *Anatrichus erinaceus* has been kindly determined for me by Professor Aldrich.

On Drosophilidae.

Stigmatomyces Sigaloessae nov. sp.

Receptacle subclavate, slightly broader at the septum, the subbasal cell sometimes much longer than the basal, stout and rather abruptly broader and convex distally, the region immediately above it abruptly somewhat narrower. Stalk-cell of the appendage short subtriangular, distally somewhat inflated. Appendage relatively small, somewhat curved, consisting of usually six or sometimes seven cells; the basal larger, distally oblique, somewhat suffused with amber-brown; the rest small, broader than long, each bearing a single antheridium; the series terminated by two; all somewhat irregularly superposed in a vertical series. Stalk-cell and secondary stalk-cell of the perithecium, as well as the basal cells and the stalk-cell of the appendage, not differing greatly in size, and forming a rather short, compact region somewhat suffused with amber-brown, narrower below. Venter of the perithecium relatively large, with broad base, subelliptical, or tapering more distinctly distally, more or less suffused with amber-brown; the wall-cells distinguished by a conspicuous ridge, or wing, which is strongly spiral, making a half turn with two strong curves: the neck and tip very slightly or not at all distinguished from one another, abruptly distinguished from the venter, hardly tapering, hyaline; the apex well distinguished, as long as the tip, the terminations of its cells forming four rounded, well defined prominences symmetrically dis-

posed about a central, terminal, rounded, tongue-like median projection formed by the symmetrically appressed lips. Spores $28 \times 4 \mu$. Perithecia; basal and stalk-cell region $18-20 \times 32-35 \mu$, venter $75-82 \times 42-47 \mu$; neck, tip and apex $66 \times 46-54 \mu$. Appendage $45-50 \times 8-9 \mu$, its stalk-cell $16-18 \times 8 \mu$. Receptacle $72-156 \times 23-28 \mu$. Total length to tip of receptacle $225-310 \mu$.

On the superior surface of the abdomen of *Sigalocssa* sp. No. 1713, Mandeville, Jamaica, W. I.

This species is well characterized by the prominent spiral elevations on the venter, by its peculiar termination and the arrangement of its antheridia which are superposed in a single series, and arise from relatively very small cells. The appendages in all of the seven specimens examined lie flatwise against the perithecium, so that its free side view is visible in no instance, and it has not been possible to determine whether the uppermost antheridium is spinose.

***Stigmatomyces Leucophengae* nov. sp.**

Short and stout, pale dirty yellowish, the perithecium somewhat darker. Basal cell of the receptacle stout, tapering slightly below, hardly twice as long as broad; the subbasal irregularly five-sided, owing to its oblique separation from the stalk-cell of the appendage, the anterior margin half as long as the posterior, which is intruded below; the distal margin oblique and more or less strongly convex. Stalk-cell of the appendage as long as or longer than the receptacle, the upper cell of which it slightly overlaps, abruptly prominent below the appendage, which is slightly and abruptly constricted at the base, and consists of four superposed subequal cells, each bearing a single rather large antheridium on the inner side; the series ending in an erect terminal antheridium, bearing a large brownish spine externally; the basal cell not differentiated in color from the rest, hardly larger, and bearing no antheridium. Stalk-cell and secondary stalk-cell of the perithecium parallel, of about equal length; the latter somewhat larger, their upper margins horizontal and irregularly continuous: the three basal cells above subequal; the outer irregularly concave externally: venter long, straight, of about the same diameter throughout, wall-cells separated by a more or less distinct furrow distally, and each ending in a broad prominence; the four prominences surrounding the base of the neck; which diverges usually at an angle from the venter, is short, hardly longer than broad, and indistinguishable from the tip,

except that it is slightly inflated, and the region between the two is marked by a shallow depression; the tip about as long as the neck, and distally prominent on the inner side, sometimes less so on the outer below the abruptly narrower, short, bilobed, slightly sulcate apex, which is slightly inflated and about as long as broad. Spores $28 \times 3.5 \mu$. Perithecia; stalk-cells and basal region $30 \times 20 \mu$; venter $58-65 \times 20-24 \mu$; neck and tip together $23-27 \times 11.5 \mu$; apex $8 \times 8 \mu$. Appendage $55-60 \times 8 \mu$. Receptacle $26-30 \times 24 \mu$. Total length to tip of perithecium $150-210 \times 27 \mu$.

On the thorax and abdomen of *Leucophenga* sp. No. 1814, Fayetteville, Arkansas.

This species appears to be most nearly allied to *S. Notiphilae*, from which it differs, however, in numerous details. Abundant material has been examined.

On Streblidae.

Stigmatomyces Streblae nov. sp.

Slightly curved, hyaline becoming faintly tinged with pale yellow, the base of the appendage becoming slightly brownish. Basal cell of the receptacle slightly curved, slightly broader distally, the base stout, rounded, with a small pointed black foot turned sidewise; subbasal cell slightly oblique and somewhat broader than long, irregularly triangular or four-sided. Stalk-cell of the appendage lying directly above the subbasal cell, smaller and abruptly slightly narrower, of somewhat irregular outline, its pointed external lower angle slightly overlapping the subbasal cell: externally very slightly convex below, the broad insertion occupying its whole distal surface. Axis of the appendage consisting of three large and one or two small, usually sterile cells, and bearing in all nine and ten antheridia; the basal cell tinged with yellowish brown, five-sided, much broader than long, the two distal sides meeting at a very obtuse angle, the outer united to the subbasal cell, the inner bearing a small somewhat flattened cell from which two smaller ones arise; one distal, the second at the right, both of which bear pairs of antheridia, both independent, and one placed somewhat lower than the other: the subbasal cell bearing one such small cell, on which a pair of antheridia are similarly borne: the third cell bearing a pair directly: the fourth cell rarely becoming an antheridium, usually sterile and associated with a second small terminal cell: the appendage divergent, bearing the antheridia on the

upper (inner) surface: the necks of the latter thick and gelatinous, becoming more or less completely disorganized, their venters, together with the cells from which they arise, becoming so closely united that they appear as a compact cellular mass. Stalk-cell of the perithecium of somewhat rounded flattened outline, obliquely placed, smaller than the subbasal cell and in contact below with the basal cell of the receptacle; its outer margin short and straight; secondary stalk-cell larger, more rounded, externally strongly convex: basal cells small: venter very slightly inflated, somewhat longer than the distal portion, bearing distally four discrete, rather conspicuous, tubercle-like prominences, which serve abruptly to differentiate the venter from the distal portion of the perithecium; the latter somewhat bent inward, and geniculate at the junction of the tip with the neck; which is rather stout, hardly tapering, the base spreading slightly; the tip clearly distinguished by the abrupt convergence of the outer margin from its junction with the neck: the apex snout-like, small, bent slightly outward, its distal margin flat or slightly rounded, the lips hardly if at all distinguished. Spores $28 \times 3.5 \mu$, the lower segment relatively very short and blunt. Perithecia $95-105 \mu$; the neck about $35 \times 16 \mu$, the venter $50-56 \times 24-28 \mu$. Appendage $28 \times 18 \mu$. Receptacle $65-80 \times 16-20 \mu$. Total length $170-200 \mu$.

On the legs and wings of *Strebla vespertilionis* Fabr., collected on bats in Venezuela (Carricker), No. 2073b, M. C. Z.

This species, as well as the following, is rather clearly distinguished from other members of the genus by the characters of the appendage, but I have thought it undesirable to erect a new genus for its reception in view of the fact that such a genus would practically be based on the fact that the antheridia, where they occur in pairs, are independent, and do not appear to arise, as is normally the case in this genus, through the transformation of the cell which bears the primary antheridium to a secondary antheridium, on which the primary one appears to be borne. The same variation in relation sometimes occurs in the genus *Corethromyces*, although here, also, the normal development and association of the antheridial groups is like that of the more highly developed typical species of *Stigmatomyces*. In the present type, as a result of the gelatification of the thick antheridial necks, the mature appendage has an unusual appearance, and would hardly be recognized as of the *Stigmatomyces*-type; the cells closely cohering in a compact mass. The general structure of the appendage seems to be identical in both this and the following species, which also occurs on a dipterous parasite of bats; and is closely allied, although it is at

once distinguished by its greater size, the presence of a penetrating rhizoid and the conformation of its perithecium.

On Nycteribiidae.

Stigmatomyces Nycteribiidarum nov. sp.

Hyaline, becoming pale yellowish. Basal cell of the receptacle large and stout, about three times as long as broad and nearly uniform, developing no foot, and penetrating the host by means of a well developed rhizoid; subbasal cell relatively small, misplaced by the primary stalk-cell of the perithecium, which lies obliquely beside it. Stalk cell of the appendage hardly as long as broad, its basal septum somewhat oblique, its outer margin convex, slightly prominent below the broad insertion. Basal cell of the appendage somewhat brownish, especially below, slightly broader and evenly rounded distally, the margins slightly concave, the structure of the appendage as a whole like that of *S. Streblae*. Subbasal cell of the receptacle and the primary and secondary stalk-cells of the perithecium more or less similar in size, associated obliquely side by side, and forming a somewhat oblique series; the primary stalk-cell partly in contact with the basal cell of the receptacle, the secondary stalk-cell somewhat broader and larger; the region occupied by the two combined externally strongly convex, bulging outward below the concave outer margin of the outer basal cells, which are subequal and smaller: venter stout, straight, erect, but slightly inflated below the middle; the wall-cells having a twist of about one fourth of a turn, forming four corresponding terminal ridges which serve abruptly to distinguish the stout neck; the latter nearly uniform in width, or slightly spreading at the base; the tip abruptly distinguished, bent very slightly outward, slightly tapering to the large, blunt, somewhat asymmetrically rounded extremity. Spores about $25 \times 3.5 \mu$, the shorter basal segment tapering to a slender point. Perithecia $190-215 \mu$; venter $110-120 \times 45-54 \mu$; neck $70 \times 22 \mu$. Appendage about $50 \times 20-24 \mu$. Basal cell of the receptacle $85-105 \times 30-35 \mu$. Total length to tip of perithecium $330-365 \mu$.

On the inferior abdomen of a Nycteribid parasitic on *Antibaesus Grenadinus*, M. C. Z., (Brues), No. 2057.

A species closely allied to the preceding, from which it differs in its greater size, the form of its perithecium, and the basal cell of

its appendage, in the possession of a penetrating rhizoid, and in minor points.

On Anthocoridae (Hemiptera).

***Stigmatomyces Lasiochili* nov. sp.**

Very faintly tinged with greenish yellow, the basal cell and appendage, only, somewhat suffused with smoky or purplish brown. Receptacle relatively short and tapering to the pointed foot, the basal cell faintly tinged with purplish brown below, in contact distally with the secondary stalk-cell, and obliquely separated from the subtriangular subbasal cell, which overlaps two thirds to three fourths of its posterior margin. Stalk-cell of the appendage short, subtriangular, slightly longer than its distal width, very slightly prominent below the insertion. Appendage rather slender, its axis consisting of normally three cells, bearing three antheridia; the basal cell faintly brownish, elongate, about as long as the rest of the appendage, including the terminal spinose antheridium, somewhat inflated or nearly cylindrical, bearing no antheridium; the rest of the appendage, including the antheridia, more deeply colored, and separated by a horizontal dark septum; the second and third cells subequal, obliquely separated, externally slightly convex, each bearing a single antheridium distally: antheridia nearly free, the venter relatively small, the necks long, stout, slightly divergent, hardly curved, directed inward or sidewise. Stalk-cell of the perithecium similar to that of the appendage, or but slightly larger, lying beside and parallel to it, and extending to the insertion; secondary stalk-cell nearly twice as large as the primary, externally concave, lying beside it, and extending higher up: the basal cells about as large as the primary stalk-cell, and but slightly, if at all, enveloping the base of the aseigerous cavity. Perithecia, relatively large; the venter becoming very slightly inflated, two or three times as long as the short neck, which is but slightly narrower, its margins somewhat concave, subtended by four rather distinct terminal elevations of the wall cells: the tip broad, its margins concave below, more clearly distinguished than the venter, and subtended by more pronounced elevations; the apex minaret-shaped, subtended by four blunt short divergent outgrowths; its bluntly pointed apex apparently formed by the four similar, closely appressed lip-cell terminations. Spores $40-45 \times 3.5 \mu$. Perithecia $135-160 \times 30-35 \mu$.

Appendage 50-55 μ . Receptacle including foot 30-35 \times 16 μ . Total length to tip of perithecium 175-210 μ .

On various parts, especially the legs, of *Lasiochilus pallidus* Reut., a small bug belonging to the Anthocoridae. No. 2771, Grand Etang, Grenada.

The host of this species, which was kindly determined for me by Mr. Van Duzee, is the first hemipterous host reported for this genus. The species is allied to *S. virescens* and *S. Coccinelloides*, but differs widely from either of them. Abundant material was obtained at the Grand Etang where the host is very common.

On Coccinellidae (Coleoptera).

Stigmatomyces Coccinelloides nov. sp.

Hyaline or faintly yellowish. Basal cell of the receptacle straight, more than twice as long as broad, the subbasal very small, externally convex, twice as broad as long, obliquely separated from the basal, the narrower convex distal end of which is in contact with the stalk-cell of the appendage; which is about as broad as long, and in equal contact with the basal and subbasal cells, and with the stalk-cell of the perithecium; not at all prominent below the insertion of the appendage: which consists of three or four successively slightly shorter axis-cells of about equal width; the third, or all above the basal cell, bearing usually single antheridia, two to four or five in all, one of them terminal and spinose on its inner side; all the antheridia free, or nearly so, their long slender necks slightly curved outward. Stalk-cell of the perithecium short, somewhat shorter than the secondary stalk-cell, the two superposed and forming a short, constricted stalk to the perithecium; the basal cells forming the walls of the lower portion of the venter: venter, neck and tip not at all distinguished, and forming a rather long stout body, its inner margin nearly straight, its outer somewhat convex, the junctions of its wall-cells hardly indicated; the apex abruptly narrower, short, relatively broad and somewhat spreading when viewed anteriorly or posteriorly; the lip-cells growing out into tooth-like projections, the lateral ones shorter, similar, symmetrical, somewhat spreading, subtended on the inner side by a vesicular outgrowth; the outer and inner closely appressed, and forming together a somewhat longer tooth-like projection, median in position, and bent slightly inward, the outer member somewhat

broader than the inner and pointed, the inner narrower distally, but truncate, the apex thus having a very different appearance from different points of view. Spores about $45 \times 3.5 \mu$. Perithecia $85-110 \times 24-30 \mu$, its apex $22 \times 20-18 \times 25 \mu$. Appendage, to tip of terminal antheridium, $35-40 \mu$, the antheridia about 18μ . Receptacle $20-25 \times 10-12 \mu$. Total length to tip of perithecium $120-140 \mu$.

On the elytra of minute species of Coccinellidae: No. 2560 (Type) and 2059, Grenada (Brues); Nos. 1706, Mandeville, 1736 and 1752 Balaclava, Jamaica, W. I.; No. 2384, Mindanao, P. I.; No. 2175, Sarawak, Borneo.

The material of this species from Borneo and the Philippines varies somewhat from the West Indian type, the terminal cell of the appendage usually bearing two paired antheridia, while each cell above the basal may bear a single one. The projections formed by the lip-cells in this material are also relatively shorter and more blunt, but are otherwise entirely similar. In the type, and in No. 1706, all the appendages bear only two antheridia, but in the other West Indian specimens a third or fourth also arises from the subterminal cell, and the cell below it, in almost all the individuals examined. The species seems to be a rare one, and is not often found in a fully matured condition.

Stigmatomyces virescens, to which this species is most nearly allied, seems also to be widely distributed, and has been obtained from Brazil, Hayti, Jamaica and Sarawak, Borneo; individuals from the latter locality agreeing in all respects with the type.

Ilytheomyces nov. gen.

Receptacle compact, two celled, the foot and basal cell usually indistinguishable; the subbasal cell bearing the stalk-cell of the perithecium terminally and the appendage laterally. Appendage consisting of an axis of superposed cells indeterminate in number, the subbasal cell cutting off a small androphorous cell distally on the inner side, which produces typically two large, simple, colored, paired antheridia, one of which may be lacking or may be replaced by, or associated with, a sterile branchlet: the terminal cells of the axis, all those, as a rule, above the subbasal cell, giving rise to variously complicated and modified branches, usually from both the inner and outer sides. Perithecium normal, the basal and stalk-cell region well

developed, the apex more often bearing a variably developed 'trigger-appendage.'

More than a dozen forms of this type are known to me from the Eastern as well as the Western Hemisphere, all of which are parasitic on species of the dipterous genus *Ilythea*. The type appears to be so constant in the not inconsiderable number of forms already known, that I have concluded to separate it generically from any of the species of *Corcithomyces*, which is its nearest ally, although some of the members of this genus may bear free single antheridia. In the present instance the antheridia arise in usually divergent pairs from a small special cell, androphorous cell, separated distally on the inner side, from the subbasal cell of the appendage. This condition which, with slight modifications, is characteristic of all the species, is the principal basis for this separation, but it is well to bear in mind that it may prove an insufficient one, when more species have been accumulated. It differs from the nearly allied *Rhizomyces*, a genus also characteristic of dipterous hosts, in the general type of its appendage, the position of its branches, and especially of the antheridia, both being external in relation to the axis of the appendage.

The identity of the axis-cells of the appendage in *Ilytheomyces*, especially of the terminal ones, is generally lost; owing to the deep suffusion of this region, as well as to the fact that the distal ones, as they are formed, appear to undergo a threefold proliferation; the distal proliferation forming the next axis-cell above; or, if it is the last of these cells, forming a terminal branch; while the other two proliferations form the superior and inferior branches, respectively. The terminal axis-cell is thus little more than the point of union of three branches, one terminal, one superior and one inferior. The blackened base of the appendage in all the species, appears to be in contact with three cells, the basal and subbasal cells of the receptacle and the stalk-cell of the perithecium. The ascogenic cell is solitary, where the number has been determined, and the four regions of the perithecium proper are usually not definitely differentiated, with the exception of the apex, which may be very clearly distinguished.

In a majority of the species the basal cell is very small, and so combined with the foot, that it is more or less indistinguishable from it, except for its hyaline upper margin.

Among the species herewith enumerated, *I. elegans* has the most highly developed appendage and is taken as the type. *I. anomalus* on the other hand, is the simplest, and is peculiar for several reasons, notably in bearing a single antheridium, only, from its androphorous

cell. Many of the species are furnished with 'trigger-organs,' which arise as appendages from the apex of the perithecium, and evidently function, like those of *Ceratomyces* and other genera, as a means of effecting a sudden and copious discharge of spores when they come in contact with another host.

***Ilytheomyces elegans* nov. sp.**

Basal cell of the receptacle minute, almost wholly hyaline, and distinct from the foot, bulging outward below the insertion of the appendage: subbasal cell partly hyaline more or less deeply tinged with blackish brown on the side next the host, this suffusion associated with a more or less definite blackened protrusion or buffer; about twice as large as the basal cell, its lower half lying beside the latter, its upper half in contact, on its inner side, with the base of the appendage. Basal and subbasal cells of the somewhat divergent appendage opaque and indistinguishable, the androphorous cell small, flattened, hyaline, so obliquely separated from the subbasal cell as to occupy almost its whole inner margin; producing a large sessile antheridium on the right side, wholly dark brown, except the apex of the slightly outcurved neck, and on the left side a similar antheridium which may or may not be associated with, or replaced by, an erect variably developed sterile branch: the remaining cells of the nearly straight, or but slightly curved, axis usually five or six in number, seldom more: each giving rise externally to a peculiar branchlet, its base black, opaque, tooth-like, curved outward and bearing distally from the upper convex surface a perfectly hyaline vesicular, variably developed terminal portion; and also producing on the inner (upper) side single branches, more or less appressed against the axis, and branching; the lower branches more highly developed, the lowest sometimes repeating on a smaller scale the branching of the axis as a whole; the branches brown, the branchlets distally or wholly hyaline. Stalk-cell of the perithecium black-brown, becoming opaque, narrower below: hardly longer than broad, usually slightly pointed distally; the cells above hyaline, the region usually distinctly broader than the base of the venter, and lying wholly above the primary stalk-cell; the inner basal cell long and larger than the outer which protrudes more or less distinctly above the smaller secondary stalk-cell. Perithecium rather long and slender, slightly inflated near the middle, or tapering slightly almost from its base; distally somewhat

curved and tapering slightly; the wall-cell regions not distinguished, the lips hyaline, slightly vesicular; the outer wall-cell of the apex developing, at the right, a slightly divergent, strongly outcurved, slender, elongate appendage, brown with hyaline tip, the base darker, partly concealing the blunt apex of the perithecium, marked by a depression nearly opposite the pore on the inner side, which may be subtended by a more or less well defined tooth-like projection. Spores about $25 \times 2 \mu$. Perithecia $52-75 \times 16-18 \mu$; its appendage $75-140 \times 4-5 \mu$. Appendage $50-80 \mu$. Receptacle $10-14 \times 12-14 \mu$. Total length to tip of perithecium $90-145 \mu$.

On the inferior surface of the abdomen of the right side of species of *Ilythea*. No. 2043 (Type) and No. 1856, Clarkstown and Balaclava, Jamaica, W. I. No. 2524, St. George, Grenada (Brues), No. 2515, Bocas del Toro, Panama (Rorer).

This striking species which may be regarded as the type of the genus, since it illustrates its highest development, is clearly distinguished from all other American forms which are known to me, by the row of characteristic outer branchlets from the axis of the appendage. Individuals from different sources show some variation. Nos. 2524 and 1856 differ from the others in that the appendage is usually shorter with fewer cells; the perithecium and its base decidedly smaller, while the appendage, or trigger-organ, is much longer, and lacks the tooth-like projection which is always present at the base in the shorter type. These differences, however, do not appear sufficient for even varietal separation.

***Ilytheomyces manubriolatus* nov. sp.**

Basal cell of the receptacle small, indistinguishable from the foot which thus appears relatively larger, its upper edge, only, hyaline; the subbasal cell broader than long, its outer margin strongly convex, lying above the basal cell, and beside the base of the appendage; which is also in contact with the basal cell of both the receptacle and the appendage. Axis of the latter blackish brown, distally curved or recurved, the basal and subbasal cells similar and distinguished by a slight indentation of the inner margin: the upper and lower margins of the subbasal cell free; the well defined androphorous cell arising from it distally, on the inner side, subhyaline, and bearing two large, stout, brown, nearly straight, hyaline-tipped antheridia side by side; one of the latter on the left being sometimes replaced by a short,

simple, sterile branch: the two or three cells of the axis above it producing stout, upcurved, smoky brown branches above and below: the divergent bases of the lower deeply suffused externally, bent abruptly outward, the paler stout distal portion curved abruptly upward; those from the upper (inner) side stout, curved slightly inward, the two lower or the lowest only, once branched above the basal cell. Stalk-cell of the perithecium broader than long, brown, narrower than the hyaline region above; the secondary stalk-cell bearing a variously developed, straight, tooth-like, hyaline outgrowth which projects, usually somewhat obliquely, from the left side; the basal cells more or less similar, the region relatively short and compact, narrower than the base of the venter: the perithecium dull brown, darker along the inner side, of nearly the same diameter throughout, or slightly inflated below, somewhat narrower beneath the relatively very broad, nearly flat extremity, which may appear narrow if viewed edgewise; the inner lip-cell darker externally, and when viewed side-wise forming distally a slight rounded prominence; the outer lip-cell developing a long, nearly uniform, dark brown appendage, the short opaque base of which projects at right angles, thence curving in a bow abruptly upward and outward and slightly downward. Spores about $22 \times 2 \mu$. Perithecia $40-50 \times 13-16 \mu$, the apex $\times 12 \mu$; the appendage $40-60 \times 3 \mu$; the projection for the secondary stalk-cell $8-14 \mu$. Appendage about 30μ , its longest branches $45 \times 5 \mu$. Receptacle and foot 15μ . Total length to tip of perithecium $75-85 \mu$.

On species of *Ilythea*, occupying the upper surface of the inner angle of the left wing. No. 2064, (Type), St. George, Grenada; No. 1856, Balaclava, Jamaica; and also Port of Spain, Trinidad, B. W. I. No. 2514, Bocas del Toro, Panama, (Rorer).

This species is well distinguished by its perithecium, the broad flat apex of which bears an evenly curved trigger-appendage, which is as long or longer than the perithecium itself. It is closely allied to the following species, from which it is distinguished by the form of its perithecium, and the origin of the tooth-like outgrowth which, in the present instance, arises from the secondary stalk-cell. The perithecium is often somewhat twisted, so that it may be viewed in a preparation, either wholly or partly edgewise. Under these conditions the appearance of the tip necessarily varies greatly. As a rule, however, the lateral view, as above described, is the one which is seen.

***Ilytheomyces Panamensis* nov. sp.**

Basal cell of the receptacle not distinguishable from the foot, sub-basal cell small, hyaline, developing a relatively large hyaline outgrowth equaling it in diameter, projecting obliquely outward from its left side, of variable form and length and of somewhat irregular outline, slightly tapering, or usually very blunt. Appendage strongly divergent, curved outward, its axis blackened; its base in contact with the basal and subbasal cells of the receptacle, and with the stalk-cell of the perithecium: its basal cell slightly larger than the subbasal; the two somewhat obliquely separated, distinguished by a slight indentation on either side: the androphorous cell small, hyaline, and clearly distinguished, obliquely separated from the subbasal cell, and occupying half its inner margin; bearing a pair of large, brown, stout, nearly straight antheridia; the rest of the axis comprising two to three cells, which produce branches above and below; the latter pale brown, stout, or even vesicular, curved upward, their basal lower margins nearly opaque; the upper branches much more slender, tapering, and hyaline or but slightly suffused at the base, the lowest one branched above the basal cell. Stalk-cell of the perithecium relatively small and irregular, its upper half intruded between two of the cells above it; which are thick walled, somewhat vertically elongated, subsimilar; the base of the secondary stalk-cell prominent externally; the margin of the outer basal cell convex; the whole region hyaline, somewhat irregular, and slightly broader than the base of the venter: body of the perithecium pale brown, somewhat darker on the inner side, the regions not distinguished, the wall-cells with a more or less distinct twist of perhaps one quarter of a turn; its venter in general very slightly inflated, but conspicuously so on the right side; its distal half but slightly narrower, the inner margin curving abruptly to the nearly horizontal hyaline lip-region, which is partly hidden by the base of a well developed trigger-appendage, the broad black angular base of which, subtended by a more or less perceptible elevation, contrasts strongly with the paler cells about it, extending upward with but slight divergence, thence bending slightly inward for a short distance, and thence abruptly outward almost at right angles; this much longer portion of the appendage paler brown above, darker below, subhorizontal in position, its outline often irregular or wavy, its tip often slightly bent upward. Spores $28 \times 2.5 \mu$. Perithecia $36-40 \times 14 \mu$, basal cell region $12-13.5 \times 12 \mu$, its

appendage variable, the longer $85\ \mu$, including both vertical ($18\ \mu$) and horizontal ($67\ \mu$) portions. Axis of the appendage about $20\ \mu$, the longest branches $28\ \mu$; the antheridia $12 \times 3.5\ \mu$. Protrusion from subbasal cell of the receptacle $18 \times 7\ \mu$. Total length to tip of perithecium $58\text{--}68\ \mu$.

On the upper posterior surface of the left wing of *Ilythca* sp., near the base. No. 2514, Bocas del Toro, Panama.

Although this species is closely allied to *I. manubriolatus*, it is at once distinguished by the outgrowth from the subbasal cell of the receptacle which is similar to that which arises from the secondary stalk-cell in the last mentioned species. The form of the perithecium and its appendage is also very different. Fifteen adult individuals have been examined which were obtained from a host kindly collected for me by Mrs. J. B. Rorer.

***Ilytheomyces minisculus* nov. sp.**

Erect, straight above the subbasal cell, relatively slender; subbasal cell hyaline, longer than broad, prominent externally. Axis of the appendage blackened, the basal and subbasal cells indistinguishable, the androphorous cell minute, obliquely separated, the paired antheridia relatively pale, somewhat appressed, the remaining cells indistinguishable, bearing two or three inferior blackened distally recurved and few subhyaline superior branches, which are relatively slender and tapering. Stalk-cell of the perithecium about as large as the subbasal cell below it, deeply suffused with dark reddish brown, the hyaline region above broader, tapering slightly downward, all the cells sub-similar, longer than broad and externally convex; the perithecium dark reddish brown, straight, nearly symmetrical, the inner margin more convex, tapering slightly, its termination bluntly rounded, the lips merely indicated by a slight irregularity, the left and the posterior lip-cells combined to form a free, very slightly upcurved, bluntly tipped prolongation, diverging at an angle of about 45° , the left half pale brown, the posterior hyaline; the lip-cells misplaced by a quarter turn of the whole series of wall-cells, as a result of which the left and the posterior lip-cells both become anterior; while the right and anterior occupy the posterior (inner) side. Spores about $22 \times 2\ \mu$. Perithecia $48\text{--}50 \times 15\ \mu$; the stalk-cell $9 \times 7.5\ \mu$; the hyaline region above it $18 \times 14\ \mu$; its terminal projection $15 \times 5\ \mu$. Axis of the appendage $30\ \mu$, its longest branches $35\ \mu$, the antheridia $12\ \mu$. Total length to tip of perithecium $70\text{--}90\ \mu$.

Near the base of the right wing of *Ilythea* sp., No. 2043, Clarkstown, Jamaica, W. I.

A species clearly distinguished from the related *I. calycinus* and other allied forms by the divergent projection from the apex of its perithecium, formed by a combination of two misplaced lip-cells. Sixteen specimens have been examined which show no essential variations.

***Ilytheomyces lingulatus* nov. sp.**

More or less strongly curved throughout, the basal cell of the receptacle very minute, only the hyaline edge, below the insertion of the appendage, distinguished from the foot; subbasal cell strongly convex outward. Axis of the appendage black, strongly curved outward, its basal cell somewhat narrower than the subbasal; the latter hardly larger than the somewhat obliquely separated androphorous cell which bears a pair of slightly divergent, brown, relatively large, stout antheridia: the rest of the axis comprising not more than two cells, the lower bearing no branch on the outer side and a stout several times divided faintly brownish branch on the inner side, which constitutes the bulk of the appendage, its stout branchlets curved outward; the terminal cell ending in a curved prolongation and bearing a pale simple branchlet from its upper side. Stalk-cell of the perithecium relatively small, hyaline, becoming brownish below, partly overlapped by the considerably larger, hyaline, secondary stalk-cell, which bulges outward above it, its outer margin convex, as is that of the somewhat smaller outer basal cell which is tinged with brown; the inner basal cell vertically elongated, narrow, hyaline; body of the perithecium brown or blackish brown; the venter convex externally, the inner margin nearly straight; the region of the tip and apex broad, slightly flaring, clearly defined below by a slight depression, the margins broadly suffused with deeper color; the outer convex, and ending in a slight rounded elevation, from which the distal margin turns abruptly inward at right angles; the inner lip-cell opaque, and prolonged to form a conspicuous, slightly divergent, tongue-like appendage, somewhat recurved at its tip, which is edged above and within by a perfectly hyaline prolongation of the left lip-cell. Spores $35 \times 3 \mu$. Perithecia $35 \times 14-17 \mu$; its tongue-like prolongation $16-18 \times 5 \mu$, the free portion $9-10 \mu$. Black axis of the appendage $25-30 \mu$, its longest branches $35 \times 3.5 \mu$; antheridia 18μ . Total length to tip of perithecium $55-65 \mu$.

Near the base of the right wing of *Ilythea* sp., on the upper side. No. 2064 (Type), St. George, Grenada; No. 1723, Mandeville, Jamaica, and Port of Spain, Trinidad, B. W. I. No. 2514, Bocas del Toro, Panama, (Rorer).

***Ilytheomyces major* nov. sp.**

Relatively long and slender; general habit straight, with local curvature of the receptacle and in the region of the perithecial stalk-cell. Basal cell of the receptacle combined with the foot, but its hyaline distal wall and lumen clearly visible below the insertion of the appendage; the subbasal cell considerably enlarged, curved, its outer margin strongly convex, bulging below. Axis of the appendage diverging at an angle of from 45° to 50° ; black, the outer margin even below, the inner margins of the basal and subbasal cells hyaline and separated by a deep indentation; the androphorous cell hyaline, much smaller than the subbasal cell; which bulges somewhat below it, its base almost horizontal, bearing a pair of slightly divergent, stout, brown antheridia; the rest of the axis comprising perhaps two or three more or less indistinguishable cells, from which stout faintly brownish branches are developed above and below; the base of the lowest outer branch deeply blackened and somewhat recurved; the upper (inner) branches stout, curved outward and downward. Stalk-cell of the perithecium hyaline, becoming brown below, deeper externally, usually bent sidewise at its contact with the hyaline cells above; the secondary stalk-cell longer than broad, extending down to form a rounded protrusion beside the stalk-cell and forming, together with the long inner basal cell, a relatively narrow region above the stalk-cell, which is abruptly broadened by the hump-like protrusion of the outer margin of the hyaline outer basal cell: the straight erect, brown venter, long narrow and slightly, almost symmetrically, inflated, tapering slightly distally; the brown tip- and apex-region, which is hardly distinguished, straight, stout and of nearly even diameter below, but distally passing to a thick tongue-like incurved termination, its convex margin deeply colored, and ending in a very slight rounded hemispherical elevation; while its upper convex, thick, perfectly hyaline margin is continuous with the outer margin of the perithecium, the transition from the suffused to the hyaline area marked by a hardly perceptible depression. Spores $45 \times 3 \mu$. Perithecia $58-68 \times 18 \mu$; the tongue-like termination $10 \times 8 \mu$; the basal cell region $25 \times 10 \mu$ below, $\times 14 \mu$ above. Appendage; axis about

35 μ ; longest branches $55 \times 5-6 \mu$; antheridia about $12 \times 4.5 \mu$. Total length to tip of perithecium 90-110 μ .

On the upper surface of the right wing of *Ilythea* sp. near the base. No. 2513, Bocas del Toro, Panama.

This species was obtained from a host for which I am indebted to the kindness of Mrs. J. B. Rorer. It is closely allied to *I. lingulatus*, but differs in its much greater size, straight habit and the conformation of its perithecium, as well as in minor points. A comparison of the fifteen adult specimens which have been examined with the abundant material available of *I. lingulatus*, shows that the two do not tend to vary toward intermediate forms.

***Ilytheomyces calycinus* nov. sp.**

General axis irregularly curved inward, somewhat zigzag below the venter. Subbasal cell relatively large, curved, or strongly bulging outward. Appendage variably divergent, its axis blackened, the basal and subbasal cells hyaline along the inner margin, distinguished by a slight indentation; the small subhyaline androphorous cell bearing a pair of rather strongly divergent, wholly brown, relatively slender, evenly tapering, distally outcurved antheridia: the axis above comprising two or three indistinguishable cells, the branchlets relatively short and scanty; the two lower blackened externally below, paler distally above; the upper branches short, simple, not well developed, somewhat brownish. Stalk-cell of the perithecium narrow, slightly longer than broad, smoky brown below; the cells above hyaline, relatively small and subequal, with convex margins; the perithecium dark blackish brown, the lower wall-cells slightly prominent, the inner margin nearly straight, the outer convex; the apex rather abruptly distinguished, slightly spreading, its four lip-cells dark brown with hyaline terminations, the brown portions externally convex, the convexities separated from one another by paler furrows, the whole suggesting the slightly spreading lobes of a calyx; the right lateral lip forming distally a hyaline flat-topped projection, which bulges outward and inward, the outer lobe broader, the whole almost as broad as the entire distal margin of the apex which it surmounts; the left lip-cell also forming distally a narrow, slightly tapering, bluntly tipped prolongation directed obliquely inward, and projecting but slightly beyond the inner lobe of the right lip-cell. Spores $25 \times 2.5 \mu$. Perithecia $60-68 \times 17-20 \mu$; the apex $15-17 \times 15-17 \mu$; stalk- and basal

cell region $18 \times 12 \mu$. Subbasal cell of the receptacle 12μ . Axis of the appendage $25-35 \mu$, the longest branch 20μ ; the antheridia 14μ . Total length to tip of perithecium $90-110 \mu$.

On the upper surface of the left wing near the base of *Ilythea* sp. No. 1929 (Type) Battersea, and No. 2043d, Clarkstown, Jamaica, W. I.

This minute species is clearly distinguished by the peculiar development of its apex; the suffused portion of which, when viewed side-wise, has the appearance of a slightly opened four-lobed calyx. The four lower wall-cells, forming the venter proper, are relatively short and distally more distinctly prominent than in other related species. It is most nearly allied to *I. obtusus*, which also lacks anything in the nature of a trigger-organ.

***Ilytheomyces obtusus* nov. sp.**

General axis erect, with four slight successive curvatures. Subbasal cell relatively small, hardly broader than long, its outer margin but slightly convex. Axis of the appendage blackish, except along its inner margin; the basal cell somewhat longer and narrower than the subbasal; the androphorous cell relatively small, hyaline, its base but slightly oblique; bearing a pair of relatively short, brown, slightly out-curved and divergent antheridia; the third cell commonly producing only the usual inferior branch, the other two both inferior and superior branches, the upper bearing one or more slightly tapering branchlets. Stalk-cell of the perithecium about as large as the subbasal cell below it, hardly longer than broad, slightly intruded above, somewhat larger than the small subsimilar hyaline cells above it, the secondary stalk-cell producing a tooth-like, straight, slightly curved, or even recurved, blunt, somewhat tapering outgrowth, which arising externally, or usually on the left side, projects obliquely forward: the perithecium wholly dark brown, straight, the axis bent outward, the margins asymmetrically convex, the apex wholly brown with a lateral vertically elongated lighter area, bent inward, clearly distinguished, broad, short, distally asymmetrically rounded; the lips forming slight irregularities in the outline. Spores $30 \times 2.5 \mu$. Perithecia $48 \times 18-20 \mu$. Axis of appendage 30μ , longest branch 35μ . Subbasal cell $6-7 \mu$. Total length to tip of perithecium 80μ .

Near base of left wing of *Ilythea* sp., No. 2043e, Clarkstown, Jamaica, W. I.

This species is well distinguished by the brown, rounded, unmodified apex of its perithecium, and by the peculiar outgrowth from its secondary stalk-cell, which resembles that which occurs in the same position in *I. manubriolatus*, to which it is probably most nearly related; although its apex is very differently shaped, and lacks the well developed trigger-organ of the latter species. It appears to be rare, only a dozen individuals having been examined, from a single host.

***Ilytheomyces anomalus* nov. sp.**

Straight, erect. Basal cell of the receptacle distally hyaline and clearly visible, subbasal cell long-triangular, pointed below, hyaline. Axis of the appendage stout, opaque below, dark brown and but slightly bent distally, the basal and subbasal cells large, opaque, distinguished by slight indentations on both sides, the androphorous cell minute, squarish, pale brownish, bearing terminally a single larger straight stout antheridium, the venter mostly hyaline, the neck purplish, except the hyaline tip; the remainder of the axis consisting of about five obliquely separated cells, the two lower much larger; the second bearing externally a blunt, spur-like projection resembling an abortive antheridium; the rest producing, from the upper side only, short, single, stout, more or less abortive simple branches. Stalk-cell of the perithecium hyaline, very large, distally prominent below the almost opaque small inner basal cell, and separated obliquely from the secondary stalk-cell, which is also obliquely separated from the small, strongly protruding, more or less suffused outer basal cell: the perithecium becoming blackish brown, the upper limits of the lower wall-cells indicated by variably conspicuous indentations, stout and nearly symmetrical below the somewhat tapering tip and apex-region; which may become rather clearly distinguished, and is more or less distinctly curved outward to the rather broad rounded or somewhat flattened termination; the subhyaline lip-edges indistinguishable, or but slightly prominent. Spores $28 \times 2.8 \mu$. Perithecia $50 \times 16-62 \times 24 \mu$: stalk-cell $20-50 \mu$; the stalk- and basal cell region $32-60 \times 13-17 \mu$. Receptacle including foot 28μ . Axis of appendage 50μ ; antheridia 16μ . Total length to tip of perithecium $100-140 \mu$.

On the posterior right leg of *Ilythea* sp. No. 2043b, Clarkstown, Jamaica, W. I.

This species departs rather strikingly from the normal type of the

genus and is distinguished by its straight receptacle, greatly developed perithecial stalk-cell, stout appendage in which a spur from the fourth cell replaces all the lower branches; while the upper are more or less abortive; in its solitary antheridium and entirely normal perithecium. A small number of very mature individuals which have been examined, are much larger than the others, darker; the protrusions of the cells below the perithecium, as well as the differentiation of its wall-cells, being much more conspicuous. One individual examined is associated with a simple functional male individual consisting of two cells, terminated by an antheridium. Other individuals, however, removed and still adherent, show that both spores of a pair may develop normally.

Laboulbenia Sapromyzae nov. sp.

Straight and rather slender, the perithecium and outer appendage divergent; cells III and IV replaced by a single cell. Basal and sub-basal cell hyaline or slightly soiled, the basal usually slightly longer, the subbasal abruptly somewhat broader; cells III-IV soiled with dirty olivaceous brown, inconspicuously striate-punctate, abruptly prominent below the insertion-cell; cell V relatively long and narrow, its inner margin distally free, so that the thick olive-black insertion-cell is quite free; the basal cells of the outer and inner appendages free, divergent; the latter obliquely terminal, small, pale, usually bearing a pair of short, olive-brown antheridial branchlets right and left; the antheridia single, large, olivaceous: the outer appendage terminal, consisting of usually three cells deeply suffused with olive brown, usually terminated by a pair of branchlets; the two lower cells each producing distally on the inner side a branch, the lower sometimes twice branched, but usually two celled with a pair of terminal branchlets; while the upper bears a similar pair, or only one, directly from its basal cell; the branchlets, of which there may thus be seven or less, rather stout, nearly uniform, blunt distally hyaline or paler, lying in a radial plane, some of them usually characteristically curled or curved outward, distally. Perithecium dark translucent olive brown, finely granular, but slightly asymmetrical, narrow, very slightly inflated, tapering evenly from below the middle to the broad blunt apex, the upper margin of which usually presents a small median rounded elevation; the wall-cells describing a quarter of a turn from right to left, so that the anterior or posterior side is normally presented, the lateral view, which is not often seen, being of the more normal

type; the broad termination of the almost opaque posterior lip-cell contrasting with, and extending above and over the pale, externally slightly convex anterior lip-cell: the basal cell region concolorous, small, externally somewhat prominent. Spores $50 \times 4 \mu$. Perithecia $85-105 \times 18-22 \mu$. Receptacle $70-105 \times 18-20 \mu$. Appendage, longer branches, $90-100 \mu$. Total length to tip of perithecium $175-225 \mu$.

On the wings of *Sapromyza triseriata* Coq. and on *Sapromyza* sp., Nos. 1630 and 1631, Los Amates, Guatemala, (Kellerman).

This species belongs to the section formerly separated as *Ceraimyces*, with which it agrees except for the presence of cell V; the receptacle thus corresponding to Spegazzini's '*Laboulbeniella*'. Abundant material has been examined which, apart from slight differences in the branches of the appendages, shows no important variation. The tip, however, varies in appearance very greatly, when, as sometimes happens, it is viewed laterally in the position normal to the genus.

***Laboulbenia muscariae* nov. sp.**

Habit slender, the perithecium and outer appendage approximated; usually straight, except that the perithecium is evenly and characteristically curved inward from its stalk-cell to its apex. Receptacle becoming faintly suffused, the basal and subbasal cells of nearly the same diameter throughout, or slightly broader at the septa, becoming faintly punctate: cell III-IV more distinctly punctate-striate, conspicuously rounded outward below the insertion; cell V about half as long, narrow, clearly defined. Insertion-cell free, opaque, continuous with the outcurved concolorous axis of the outer appendage, which arises from it terminally; the basal cell of the inner appendage arising laterally from its inner side, very small, hyaline, producing a usually two-celled brownish antheridial branchlet on either side, terminated by a pair of brownish antheridia in close contact, and lying obliquely across the venter of the perithecium on either side: the axis of the outer appendage consisting of usually three cells ending in a pair of branchlets; the two lower cells each bearing a branch distally on the inner side, the lowest blackened externally, and bearing branchlets, sometimes three side by side, of the second or even third order; the branchlets distally pale, or hyaline, stout, blunt, extending somewhat above the apex of the perithecium. Perithecium dark olive, the lower wall-cells at first distinctly paler; the region of the subbasal wall-

cells sometimes abruptly darker and very slightly inflated; the perithecium tapering thence to the symmetrically rounded, long, narrow, finger-like termination of the apex; which is abruptly distinguished by a large nearly black, externally slightly convex area, which subtends it on the inner side, and by an umbonate black elevation, which subtends it externally and contrasts strongly with a pale area immediately below it. Spores $52 \times 4 \mu$. Perithecia $90-110 \times 16-20 \mu$. Receptacle $88-15 \times 18 \mu$. Appendage to tips of longest branches 105μ . Total length to tip of perithecium $200-230 \mu$.

Near the base of the left wings of *Sapromyza muscaria* Lev. No. 1629, Los Amates, Guatemala (Kellerman).

Although this species is nearly allied to *L. Sapromyzae*, it is at once distinguished by the finger-like apex of its characteristically curved perithecium. Like the last mentioned species, it belongs to the section of the genus formerly distinguished as *Ceraiomycetes*, its receptacle also corresponding to the type of Spegazzini's '*Laboubeniella*'. The infested host was found among a small lot of flies collected for me by the late Professor Kellerman.

Laboulbenia crispata nov. sp.

Slender, straight, or somewhat curved. Basal cell of the receptacle nearly hyaline, slender, subclavate, obliquely and asymmetrically adjusted to the much shorter olivaceous subbasal cell, which is distally very obliquely related to the stalk cell of the perithecium (cell VI) and less so to cell III-IV, which is similar or slightly larger, externally convex, bulging but slightly below the broad insertion, and more than twice as long as the narrow, but clearly defined cell V, both cells pale olivaceous. Insertion-cell broad, flat, almost opaque: basal cell of the inner appendage dark brown, small, bearing branches right and left; their basal cells brown, the rest hyaline with dark septa: axis of the outer appendage opaque, bearing usually three branches externally and one terminally, each of the latter bearing a pair of branchlets terminally from their basal cells; the branchlets lying in a radial plane, deep brown, nearly uniform throughout, very long, slender, subparallel, curved inward across or over the perithecium, extending free far beyond it, their extremities, especially those of the outer, strongly recurved inward. Perithecium somewhat darker olivaceous, usually strongly curved across the base of the appendage, somewhat, inflated, the limits of the wall-cells, which describe some-

what more than a quarter of a turn, indicated by fine, more or less distinct dark lines of separation; the body somewhat inflated, tapering distally to the broad, slightly angular, or oblique termination; the rather coarse lip-edges hyaline, or olivaceous, irregularly prominent; the anterior lip-cell developing a slightly curved, blunt-tipped, erect free projection of nearly uniform diameter; which, owing to the twisted wall-cells, appears to be lateral (left). Spores approximately $25 \times 3 \mu$ (measured in perithecium). Perithecium $85 \times 22 \mu$; its terminal projection $10-12 \times 3.5-4 \mu$. Receptacle to insertion-cell, 120μ ; basal and subbasal cells $62 \times 12 \mu$; cell III-IV $35 \times 16 \mu$. Appendage about 225μ . Total length to tip of apical projection about 175μ .

On the abdomen of *Hippelates* sp., No. 2516, Bocas del Toro, Panama.

I am indebted for the host on which this very distinct and graceful species was found, to the kindness of Mrs. J. B. Rorer. Only four specimens have been examined, in which antheridia are no longer present, or are not visible on the partly concealed appendage. The insertion-cell is similar in all respects to that of normal types; but, as in the two preceding species, the receptacle is of the '*Laboulbeniella* type', cells III and IV being replaced by a single cell.

***Laboulbenia anguifera* nov. sp.**

Long and slender, straight, or more or less curved; the subhyaline basal and subbasal cells contrasting abruptly with the uniformly dark olive brown portions above. Basal cell nearly uniform throughout, one third to one fourth as long as the subbasal cell; which is broader and nearly uniform, except for an abrupt, bulb-like, subsymmetrical enlargement at its base, which may be twice the diameter of the basal cell; somewhat obliquely separated from cell VI; which is relatively small, as well as from the relatively small cell which corresponds to cells III-V, and is externally thick-walled and slightly convex. Insertion-cell broad thick and opaque, the minute hyaline basal cell of the inner appendage obliquely separated from it, and bearing a branch on either side, distinguished by a blackened septum, and producing single, straight antheridia with hardly differentiated necks; as well as two to four erect, slender, tapering, faintly brownish simple branchlets, which may reach as far as the apex of the perithecium: basal cell of the outer appendage blackened externally and dis-

tally, short and broad; bearing distally in a radial series four to seven, or even eight, closely set, erect branches with blackened basal septa; their comparatively short basal cells bearing distally elongate branchlets, usually radially associated in pairs, one member of which may occasionally be replaced by an antheridium; the branchlets long, hyaline to brownish, with here and there a secondary branchlet, somewhat uniform, diverging in a more or less compact fascicle, often irregularly nodular distally, or swollen at the remote septa; some of them ending in characteristic, rather close spirals. Perithecium nearly straight, concolorous with the small basal and stalk-cell region, from which it is distinguished below by a slight elevation, only, which marks the base of the lower tier of wall-cells; which also form a rather prominent ridge distally, the body of the perithecium in this region being slightly inflated, tapering continuously from this elevation to the narrow apex; the wall-cells describing more than a quarter of a turn: the right and posterior lip-cells misplaced, and combined to form a narrow, dark, blunt, hyaline, pointed prolongation, which is terminal and external; the two remaining lip-cells forming, below it, a hyaline, slightly prominent area. Spores $50 \times 3.5 \mu$. Perithecium, including basal cell region ($7-10 \mu$), $100-130 \times 24-30 \mu$. Receptacle to insertion-cell $250-270 \mu$; basal and subbasal cells $218-245 \times 14-18 \mu$, the bulbous enlargement $\times 35 \mu$ or less. Longest appendages 210μ .

On various parts of *Hippelates* sp., No. 2811B, St. George, Grenada, B. W. I.

This species has been obtained in abundance on material collected for me by Mr. Phillip, to whom I am also indebted for other interesting hosts. It is of special interest, since it has the typical receptacle of '*Ceraiomycetes*,' cells III-V being replaced by a single cell, while its insertion-cell and appendages are of the normal *Laboulbenia*-type. The form of pointed perithecium is peculiar and distinctive, while the spiral terminations of many of the branches of the appendage resemble those of many trichogynes, and are quite unlike the more or less indefinite spirals seen in *L. spiralis*.